VIDEO COMPUTER SYSTEMS
pragma
for terminals
01-952 8471
FLOPPY DISC · PRINTERS · PLOTTERS

'UK first choice for new investment'—NCR boss

From Keith Jonas in Dayton, Ohio

DESPITE the cutbacks in its workforce being made by NCR at its Dundee factory due to changes in technology the company's president, Charles Exley, favours Dundee as the location for any new European manufacturing facilities that may be required by NCR in the future.

Exley told Computer Weekly: "If we needed to expand our manufacturing capability in Europe we would invest in the UK. One reason is that we consider labour relations to be good in the East of Scotland."

Exley pointed out that the Dundee plant is now manufacturing NCR machines ranging in size from the 8200 series of interactive multi-terminal business systems up to the 8500 series of medium scale mainframes. But he confirmed that Dundee will not build the 8600 series of large scale mainframes which will soon be competing with systems as powerful as the IBM 3033.

The 8600 is expected to be announced before the end of this year and Exley freely admitted that NCR had lost some big customers in the past through not being able to offer them the capability to upgrade to a large scale mainframe.

Looking at word processing, a growing market not yet exploited by NCR, Exley said that his company had no plans yet to move into the word processing business, and stated frankly: "We do not understand the requirements of the market and in any case we are too busy with other things at the moment. But word processing undoubtedly has great potential."

The majority of NCR's business comes from customers in retailing and banking, many of whom could be intimately involved with Electronics Funds Transfer Systems when and if they are implemented on a significant scale. But Exley is rather sceptical about the prospects of one aspect of EFTS, automatic debiting, catching on in a big way.

"I cannot see automatic debiting appealing greatly to the consumer because his bank account would be debited directly and immediately from the terminal in the shop so he would lose the advantage of float.

"In addition, the cheques that consumers use for payment at the moment cost them nothing so why should they bother with automatic debiting?"

NEWS IN BRIEF

Honeywell boosts Level 6

BOOSTING the top end of its Level 6 minicomputer family, Honeywell has introduced the Model 57 which is software compatible with existing Level 6 minis. At the same time the smallest Level 6 machine, the Model 36, has been replaced by the Model 33. Prices for Model 33 and Model 57 start £4,000 £31,000 respectively.

UK subsidiary

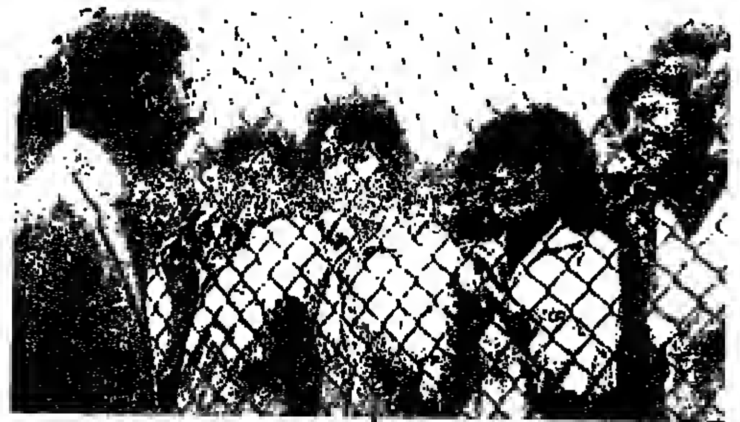
THE US company that manufactures the Basic/Four multi-terminal commercial system, Management Assistance Inc, of California, has established a wholly owned UK subsidiary by purchasing the firm that has been distributing its systems here since early last year, Basic/Four (UK) Ltd

Wanted: Inmos

GREATER Manchester has joined the growing list of regional authorities staking a claim for Inmos, the NEB's fledgeling semiconductor company. Voiced by the North West Industrial Development Association, the claim is based on the region's existing experience in the field, with companies like ICL, IBM, NCR, Honeywell and Ferranti already established in the area.

Cray power in UK

ONLINE access to a Cray-1 vector processor is now available in the UK via the LUCS bureau's parent company, United Computing Systems Inc of Kansas City. Meanwhile Cray Research has received an order for an $8.8 million Cray-1 from AT&T subsidiary Bell Labs for installation at its Murray Hill, New Jersey plant in 12 months' time.



Looking suitably thrilled by the presence of HRH Prince Charles are these ladies being safely held in check by the fence around one of the Cossor Electronics' factories at Harlow, Essex. The four ladies are (from left) Dot Natt, "Flo" Dimaline, Mary Reed and Shashi Kumre.

Prince Charles visited Cossor last Thursday in order to pick up the information on the electronics industry in readiness for a meeting he attended the following day of the Radio, Radar and Electronic Capital Goods Industrial Strategy Sector Working Party at the National Economic Development Office.

Qume launches double density diskette drive

From Louise Keyhoe in California

SHORTLY after news that it is likely to be taken over by ITT (CW, September 28) Qume has entered the disc drive market with a dual sided double density diskette which it is to manufacture under licence from YE Data of Japan.

Qume claims to have overcome the media wear problem which have dogged dual sided disc technology, and expects to have its Data Trak 8, eight inch drive in volume production early next year. The company will follow up with a 5¼ inch drive in the second quarter of 1979. Qume is already sampling the Data Trak 8 to unnamed OEM customers.

Data Trak 8 stores 1.8 Mbytes of unformatted data and 1.2 Mbytes in IBM format and is compatible with existing drives. Facit, which markets Qume printers, is to discuss European marketing of the drive next week.

Elliot Wasserman, Qume vice president of marketing, said that he expects Data Trak 8 to be used in a wide variety of systems. He suggested that they would be incorporated in word processors, test equipment, medical systems, and home computers as well as general data processing systems.

"The Data Trak 8 introduction will mark the long awaited shift by word processor and small business system makers to the higher capacity drives", he noted.

According to Qume, the Data Trak drive has consistently passed more than 100,000 "taps" with no measurable degradation of signal amplitude. Tap tests indicate media wear caused by repeated access at a single location on the most frequently used tracks.

Low media wear was achieved by electronically and mechanically controlling the head landing and take-off dynamics until the needed combination was attained — a fast approach and slow soft landing followed by a a slow take-off with rapid acceleration.

Details of first System X sites

THE first two System X exchanges to be ordered by the Post Office will be for Woodbridge in Suffolk and Baynards House in the City of London. The orders will be placed with one of the System X contractors early next year and have already been approved by Post Office senior management.

Woodbridge will have a small 930 line exchange and Baynards House a junction tandem exchange to handle traffic between local exchanges.

Since mounting a display at Communications 78 in April the Post Office has let out very little information on System X, other than a rough schedule for its phased introduction between 1981 and 2010.

Plessey, GEC and STC are the Post Office's major telecommunications suppliers, and Plessey has been developing System X components at Taplow, Berks and at Edge Lane in Liverpool where the System X building was occupied for two weeks by workers protesting against compulsory redundancies (CW, October 12).

Thomson order

TO enhance its reservations and administration system, Thomson Holidays has ordered a Jacquard word processing system from Hallmark Computers of Chiswick, London.

US court throws out appeals by Milgo

THE US Supreme Court in Washington has refused to hear appeals by Racal-Milgo on some of its antitrust claims against Western Electric regarding the connection of modems to AT&T's telephone network.

The district court, in rejecting the claims, held that Western Electric was immune to antitrust laws because the FCC had exclusive jurisdiction over its activities.

The legal battle started in 1973 when Western Electric sued Milgo, claiming violation of patents on several modems. Milgo countersued in April 1974 asking $14 million from Western Electric as damages for breaking antitrust laws by combining with AT&T and Bell operating companies to buy Western Electric modems exclusively and impose discriminatory tariffs on non-Bell modems.

Non-Bell modems must be connected to the telephone network, according to Milgo, via "expensive and troublesome" DAA data access arrangements for which the tariff was allegedly filed without FCC approval.

Western Electric did not oppose the appeal because it wants a once-for-all decision on the antitrust aspects of this case which relate to more than 30 suits now in process.

The Supreme Court said that the rejected claims could not be reviewed until the rest of Milgo's claims against Western Electric had been heard.

A double touch of luck

THERE'S more than a touch of luck about the names X-Data and Computercall, the peripherals wholesaler and service call logging and supply companies set up by Henry Lewis. The names are also carried by two racehorses owned by Henry's brother Sam, a fellow director in the companies.

Last week X-Data romped home at Haydock Park at 33/1 to score her first win and on Tuesday, Computercall continued the success story with a 10/1 victory at Edinburgh. Commenting on the wins Henry Lewis said, "Value for money is nothing new for X-Data, we lead the field in pricing. And Computercall was just living up to its name."

trust tds The Display Specialists

Terminal Display Systems Ltd.
Hillside, Whitebirk Estate, Blackburn, BB1 5SN. Telephone (0254) 61244 Telex 63152 TDS G

CORAL 66 FOR THE PDP-11
CORAL 66 FOR THE LSI-2
HPAC COMPILERS TO ENSURE PORTABILITY, SAFEGUARDING OF YOUR SOFTWARE INVESTMENT, MULTIPLE HARDWARE SOURCING, GREATER MARKET COVERAGE, SPEED OF IMPLEMENTATION, EASE OF MAINTENANCE, NO RE-WRITES AND PEACE OF MIND.
A WAY OF PREPARING FOR THE FUTURE WITHOUT PREDICTING IT
(0865) 724851/2
HPAC

Atlantic Computer Leasing Ltd. 27 Chancery Lane, London WC2 Tel 01-405 8238. Telex 268344
ATLANTIC
IMMEDIATE DELIVERY
370/148.KOO Processor available as KOO or JOO with or without ISC feature. U.K. language machine, one year old.
Please call us for sale or lease prices.

NEW

H1400 VDU £550
Low cost video terminal
● 1920 Character (24x80) display
● Cursor addressing and sensing
● Switchable speeds to 9600 baud
● CCITT V24 interface
RAIR
30-32 Neal Street, London WC2H 9PS
Telephone 01-836 4663, Telex 298452

Printed in Great Britain by Q.B. Limited, Sheepen Place, Colchester, CO3 3LJ, and published by IPC Electrical-Electronic Press Ltd., Dorset House, Stamford Street, London SE1 9LU.

VIDEO COMPUTER SYSTEMS
pragma
for terminals
01-952 8471
FLOPPY DISC PRINTERS PLOTTERS

COMPUTER WEEKLY
Number 625 Thursday, November 2, 1978 Price 18p

NEWBURY
The home of Low Cost Visual Display Terminals
PRICES FROM £495
Newbury Laboratories Ltd: Head Office & Sales King Street, Odiham Hampshire RG25 1NN
Tel 025-671 2910 Telex 858815

'Cross should have left earlier'—ICL chairman

THE man who appointed Geoff Cross to head ICL, the company's chairman Tom Hudson, has said that he wished Cross had left the company a year before he did, last year.

Speaking last week at a Press briefing to celebrate ICL's tenth anniversary, Hudson also re-opened a sore that has festered within ICL ever since its inception when he declared that if he had been chairman in 1968 he would have killed the English Electric System 4 line, because of the failure of English Electric to provide adequate "organisational backing" for System 4. English Electric merged with ICT to form ICL.

The merger, he said, had cost ICL about £80 million in trying to create a unified organisational structure and product line.

In a pointed reference to recent criticisms from the Public Accounts Committee (CW, October 12) about ICL's slowness in repaying the £40 million loan which Hudson said had been "extracted" from the government to help develop the 2900 series, Hudson wryly commented that the £40 million could be viewed as "a 50% instalment" by the government to cover the costs it had bequeathed to ICL by what he obviously saw as a forced merger.

On Geoffrey Cross, whom Hudson had recommended as managing director in 1972, shortly after he himself had become chairman, Hudson said that for four years Cross had fulfilled the corporate need at that time and that his contribution to the company had been "essential, desirable and invaluable."

But from 1976 the man suited to lead ICL into the next decade, he said, was someone with a wider understanding of the computer industry and of marketing, such as the new managing director, Dr Chris Wilson.

● Full report on Hudson and Dr Wilson speeches, page 12.

Blowing out the candles at ICL's tenth birthday Press "party" last week is Computer Weekly editor Malcolm Peltu, watched by ICL chairman Tom Hudson (left) and the head of ICL's public relations, Donald Cook (background). It took but one breath to douse the flames.

Briefing

Software not excluded

COMPUTER software is not excluded from the Queen's Award to Industry after all, according to the office which administers the scheme. It admits, though, that confusion may have arisen in the past from replies given to intending or unsuccessful applicants.

The Computing Services Association, which wrote to the Queen's Award Office to query the policy (CW, September 28), has been told that there is no question of software being ineligible for the award.

Off to Greece

A THREE-MAN delegation from the UK, headed by director-general of the Computing Services Association Alan Benjamin, is visiting Greece this week at the invitation of the Greek government to discuss the contribution the UK could make to the development of the Greek computing activities.

Savings bank challenge

A BOLD move by ICL to challenge Philips, Datasaab, Nixdorf and Olivetti in the savings bank counter terminals market has won the company an order for some 200 terminals from the Anglia, Hastings and Thanet Building Society.

ICL's device is based on the 7500 cluster terminal system with a specially designed 480 character CRT terminal with mag-card reader and passbook/tally roll printer from Okidata.

Telefile new chief

FOLLOWING a "greater deficit than expected" in the last financial year, Telefile has made Hal Eden, previously vice-president of technology, the new chief executive of the company.

● Telefile's first UK plug-compatible customer — Back page.

System 38 price

A LARGE configuration of IBM's new System 38 business computer is rather cheaper than the company first indicated. Having redone its sums, IBM now says that a System 38 with 30 displays, 10 printers, 1.5 Megabytes of main memory, 390 Megabytes on disc and two 650 lpm printers would cost £268,000, and not the £330,000 stated last week (CW, October 26). The rental would be £7,200 a month on a three-year lease.

Medical fears

IN TRYING to calm medical fears about those of computers in a national child health care system, Social Services Secretary David Ennals has told the British Medical Association that his department was willing to consider modifications requested by doctors and confirmed that access to personal medical records would be restricted to approved research, under the control of a doctor.

Xerox to drop UK project

By Cameron Davis in Washington, and Rory Johnston in London

CONTINUING its growth in the automated office and communications market, Xerox is likely to establish a new packet-switching network in the US — but it has decided to abandon plans for establishing a large European research centre in Milton Keynes to study the development of advanced copiers and other projects related to office automation.

The official reason given for the closure of the Milton Keynes site is that the number of staff employed is lower than originally planned. But it is known that there has been considerable rivalry between the various research laboratories in the Xerox organisation on both sides of the Atlantic, and it appears that the centres in Palo Alto and Los Angeles have won out in the struggle for some of the work Milton Keynes was doing.

The 450 staff who are already in temporary accommodation in Milton Keynes are to be moved over the next year back to Welwyn Garden City, the town they were moved from in 1975.

In the US the packet-switched network would represent a significant further step for Xerox in its moves to gain a large share of the burgeoning electronic office and information systems market.

To sharpen its focus on these markets, the company recently established a new organisation, Xerox Business Systems, to deal with all products that are not copier/duplicators — namely, word processors, facsimile and non-impact printers, such as the 9700 fast laser printer for com-

● Turn to page 8

'Probe ICL in S Africa' call

THE Anti-Apartheid Movement, with support from the unions within ICL, has called for a full inquiry into ICL's activities in South Africa, and asked the UK government to take positive action to extend its arms embargo to include computers, similar to the US ban (see back page).

By means of its holdings in ICL, the AAM has also asked the government to stall further expansion plans ICL may have.

But ICL has denied that Malawi was being used as a "back door" to beat sanctions in Rhodesia, and that two 2903s recently sold to Malawi had "disappeared", as alleged by the unions.

While agreeing that the requests for the 2903s were made to ICL in the UK via ICL (Central Africa) based in Salisbury, Rhodesia, ICL has said the agreement was given Board of Trade approval and that the machines were delivered directly to Malawi. And President Banda of Malawi has just given ICL the go-ahead to set up a new company in his country.

ICL says its only contact with ICL (Central Africa) is to receive an annual visit from the Rhodesian chairman to discuss "personal matters" only.

In addition to the union bids to get ICL to disclose more information, including that contained in an alleged secret list of ICL computers being used for classified applications in South Africa, the AAM has asked ICL to publish a comprehensive list of all its systems used by military, police or other state agencies; to suspend the supply and servicing of computers to the same parties; and to start a policy of withdrawal from South Africa.

One of the effects of the US embargo has been to stimulate the growth of an indigenous manufacturing capability in South Africa (see page 16).

VSPC users angry with IBM

USERS of IBM's VSPC are angry that the company will not make available to them an end-user system that it offers both on the Call service and the newly-announced European VSPC service, EPCS (Computer Weekly, October 12).

The software in question is Applications System (AS), a series of integrated packages for direct use by managers. Some IBM customers have made substantial use of AS under Call, and are annoyed that this work cannot be brought in-house along with other Call applications.

IBM's refusal to sell the software for use on customer machines is thought to be designed to protect its own bureau services. Were independent bureaux to install the package, they would compete directly with Call and EPCS.

However, IBM has told one user that AS is not immediately accessible to the rest of the company, being owned by its original developer, the Remote Computing Services Division in the UK.

The chairman of the European

● Turn to page 8

COMPUTER WEEKLY'S INSIDE NEWS

MICRO UNIONS
Unions and the impact of the micro are increasingly being linked. One of the most active unionists in this area has been Ian Benson, who explains this week why he believes training and nationalisation are his top priorities. Page 4

PROJECT GOSPEL
A CCS survey of users slams poor project management while Programmer Notes tells the gospel truth. Pages 6/8

OPS TOPS
Our man about the ops world, Bernard Allen, has been to see some operators taking one of the TOPS training courses. Page 8

FORTRAN CALL
Users are urged to make a positive contribution to future Fortran developments and there is a further instalment in our ellolls saga in this week's lively letters. Page 11

ALSO
Computerview on loss of creative jobs 2
Inmos for Bristol? 3
Users hit out 5

Gib's Mythodology 6
Puzzler 6
People and Events 10
Letters to the Editor 11
Micro News 13
Relational Databases — Part 5 17
New light on transmission of information 20
The Sales Bit 53
Hex Kid 55

APPOINTMENTS— PAGES 23-55

Lexistron. The world processor that even a temp can use.
LEXITRON. The word processor that even a temp can use.
Data Logic
Word Processing Division
Westway House, 320 Ruislip Road East, Greenford Middlesex UB6 9BH. Telephone 01-578 9111

COMPUTER WEEKLY

Vol. 25 No. 625
Thursday, November 2, 1978

Editor
Malcolm Peltu . 01-261 8033
Deputy Editor
Tony Higgins 01-261 8806
Advertisement Manager
Harry Hutson 01-261 8022
Class Ad Manager
Brian Durrent 01-261 8597

IPC Electrical Electronic Press Ltd,
Dorset House, Stamford Street,
London, SE1 9LU.
Telephone: 01-261 8000.
Telegrams/Telex: 25137 BISPRS G

Branch Offices:
Birmingham: 202 Lynton House, Walsall Road, Birmingham 22B
Telephone 021-356 4535

Manchester: Statham House, Talbot Road, Stretford, Manchester M32
Telephone 061-872 4211

New York: 205 East 42nd Street, New York, NY 10017.
Tel (212) 867 2080 Telex 421710

Published weekly on Thursday.
Registered at the Post Office as a newspaper. Price per copy 18p

© IPC Business Press Ltd 1978.

Members of Computer Weekly staff may be contacted directly on the extensions listed below. Other departments in Dorset House may be obtained by dialling (01) 261 8000.

EDITORIAL

Keith Jones	261 8344
Tim Palmer	261 8031
Peter Hewitt	261 8303
Rory Johnston	261 8028
Martin Banks	261 8808
Robin Webster	261 8170
Bernard Allen	261 8038
Donald Hennett	261 8710
Mike Marples	261 8042
Don Mitchell	261 8042
Chris Yovett	261 8843
Nancy Pocock	261 8843

ADVERTISING
Display

Lloyd Collins	261 8787
Stuart Moore	261 8100
Steve Bars	261 8028

Manchester
Harry Aiken 061-872 4211

Birmingham
Ken Parrott 021-356 4636

Classified

Chris Price	261 8028
Eddie Farrell	261 8097
Mark Williams	261 8010
John Farrar	261 8088
Josie Poole	261 8174
Nonette Gibbs	261 8174

Manchester
Owen Kelly 061-872 4211

Birmingham
Beryl McGowan 021-356 4636

Production

Ian Carter	261 8016
Ken Walford	261 8878
Roger Albury	261 8616

Computer Weekly is sent free of charge to the following categories in the UK and Eire only: Company directors, company secretaries, management services executives, civil servants responsible for computing, management/computer consultants, lecturers and teachers, DP managers/supervisors, systems analysts/O & M officers, programmers, operators, computer salesmen, field engineers.

Controlled Circulation Department: IPC Business Press (Sales & Distribution) Ltd. 40 Bowling Green Lane, London EC1R 0NE. Tel: 01-837 3636.

Subscriptions for readers outside the above categories: One year, UK £14.60; overseas £20; USA, Canada $52. Students £7.30; overseas £10 USA, Canada $26. Airmail rates on request. Subscriptions: IPC Business Press (Sales & Distribution) Ltd, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH. Tel: 0444 59188.

Back numbers can be had as available for 40p post free.

Computer Weekly has a circulation each week of over 82,000 including the highest fully requested circulation in the UK. The International edition, which is published 10 times a year, has a circulation of over 34,000.

ISSN 0010-478

COMPUTERVIEW

Why let the computer call the tune at work?

IT is hard to see what can actually be done about the loss of skills for which Alternative Technologist Mike Cooley so eloquently mourns (see page 5).

He would hardly advocate an embargo on the introduction of computer-aided design systems and other white-collar computer equipment, if only because economic growth and retention of international competitiveness are dependent on new technology.

In addition, once one is conscious of a better way to build a mousetrap, hardly anyone would choose to return to the old way. An American typist recently, under the mistaken impression that her word processor was to be replaced by a "steam" typewriter, exclaimed, "No way am I going back to washing my clothes on a rock!"

It is indeed sad that some design workers are losing the value of their skills and their prospects for what has seemed to them interesting work. However, this has always been an inevitable part of technological change, that some specialised workers are harmed while society as a whole benefits from increased production, and this continues to be the case.

The claim that creativity is being lost is doubtful. Outside the world of Artificial Intelligence few people would say that computers are actually being creative at present, whether or not they ever will be, and the jobs that have been taken over by machines so far are definitely not creative.

They may be complex but they are still basically mechanical, and there is no benefit either to the human race or the individual worker for him to keep on doing them.

Where the machine's product is actually inferior to the human's, through enforced standardisation and the like, computerisation may be undesirable, but this is simply one of the factors that must be weighed when considering change.

Cooley's claim that people are being forced to pace their work to the speed of the machine is of more serious import. There is no technological reason for it. One of the outstanding features of computers is their infinite flexibility, which enables systems to be designed around exactly what the user needs, ready for action when required and waiting unobtrusively when not.

With hardware getting cheaper and cheaper, and liveware getting steadily more expensive, this is the only sensible way for things to work.

If systems are being installed that force-pace humans, this is not a sinister case of machines taking over; it is simply bad management. People are happier and work better when able to choose their own speed and way of doing things, as experiments with work groups replacing car assembly lines have shown.

It is certainly the business of individual workers and their unions to press for the introduction of systems that have a "human face", and their most effective way of achieving this is to show that it is in management's interest because such systems are more effective.

Certainly with the current shortage of both engineering and office staff, firms must become aware that they will not be able to fill jobs that are really "dehumanising".

Indeed, on a broader front, it may be that many of the horrific prospects for total automation will not materialise, simply through firms' realisation of their own self-interest. The story goes that the boss of General Motors was showing a totally automated car assembly line to the head of the Auto Workers Union. "How will you organise these machines?" he asked smugly.

"How will you sell them motor cars?" the union man replied.

INTERRUPT

THIS week we have a bang up-to-the-minute Interrupt concerning a system which "has implications so extensive and so profound that the term revolution is by no means an exaggeration..."

This quote comes from an advertising letter I received last month promoting a Viewdata conference.

So persuasive was the brochure, I could hardly resist it. From the likes of Rex Malik and Sam Fedida, no less, I will be able to acquire knowledge of the structure of viewdata (I thought it was now called Prestel), Post Office costs and how to design dialogues with the system.

The letter was a masterpiece, exuding expertise and PO awareness. The only trouble was that it did not have a stamp, and we had to pay the earth for the privilege of receiving it.

The moral is, of course, that he who wants to communicate must first get his protocol right.

This week's £5 Interrupt prize goes (in a stamped envelope) to Anthony Cobb of Malkins, Utkinton, Cheshire.

FOCUS

RON Yearsley of BIS Applied Systems asked recently whether DPMs were going the way of the dinosaur (CW, October 19). Fortunately none of us will be around in 135 million years' time to find out.

According to Yearsley, fossils are not now limited to science museums — they are currently flourishing in DP installations. Unless the DP manager mends his ways, and accepts the users' demands for independence, the company's requirements for office automation and the industry's progressive developments, he will find himself stranded astride his mainframe.

The DP manager, Yearsley believes, was osmotically sucked up into computer management streams and should now become the progenitor of ideas outside the installation. Most DPMs, having consulted their Concise Oxford Dictionary first, would agree. They would be only too delighted to be given the opportunity of tendering corporate advice.

Surprisingly enough, they are not unaware of the merits of word processing, the automated office and electronic mail systems.

DP management, the article suggested, should look further ahead than the end of the magnetic tape splice and step over the anti-static threshold into the great world outside. This advice was certainly in evidence at last month's Central London Branch meeting of the IDPM, when there was a record turnout for the Microcomputer Forum and display (CW, October 26).

The theme, "Is personal computing relevant to the DP industry?", was one which is obviously troubling the DPM. In fact, Yearsley would have enjoyed the occasion. DPMs were told in no uncertain manner that they were an irrelevance, standing in the way of the micro salesman and potential business users. Not many, it seems, love the DPM.

The first speaker, Paul O'Grady of Microfocus, did his best to reassure a rather apprehensive audience. Cobol, he said, was now a feature of much micro equipment and existing DP programming teams would soon become dedicated to the delights of the floppy disc.

Robin Woods, of the Isher-Woods sales organisation, suggested that the micro bug would broaden the minds of DP management, but not, presumably, their budgets. He agreed that Cobol had opened up new opportunities for the microprocessor.

There is some doubt whether the ill-fated dinosaur was designed in a practical mode. Not so the DPM. The first questions asked concerned system reliability. This concern, they were assured, was not a major micro factor. A complete replacement system could be a negligible £3,000.

Not only do micros apparently seldom break down, but many of the suppliers now have substantial financial backing. Even so, many DPMs would agree that the mainframe manufacturers all have considerable resources and their servicing arrangements are often far from ideal.

Conway Berners-Lee offered some small comfort to those present. He suggested that business problems come in all shapes and sizes and that the range of business opportunities being developed by the micro will generate ever increasing mainframe activity.

Ten years ago...

COMPUTER WEEKLY, OCTOBER 31, 1968

MAURICE Allegre replaced Robert Galley as head of the French Plan Calcul. Galley had been made scientific research minister ... So far only one private computer programming school had applied to the Department of Education and Science for recognition as efficient, MPs were told ... Plans for a £35 million computer plant in the USSR were moving forward, with talks between Soviet automation officials and Olivetti MD Bruno Visentini in Moscow ... A Japanese research group set up by Fujitsu, Hitachi and Nippon Electric was working on the design of a system claimed to be more powerful than the IBM 360/85 ... US exports of computers and related equipment were $48.8 million in August of 1968, as against $28.5 million the previous August ... Philips DS-714 message-switching computers at the Federal aviation Agency centre in Kansas City would enable US weather stations to call up forecasts for specified areas ... Home-based careers in computing were offered by Aer Lingus to "Irish graduates and other brilliant students."

Wilkes

TERMINALS
Newbury Labs' latest range of British VDUs From £495
m22 High speed, paper-tape reader punch. From £995
TALLY Now T-1612 160 c.p.s. bi-directional keyboard printer. Wide range of other Tally printers also available. From £1935
digital LA36 DECwriter II From £865
digital LS120 DECwriter III From £1995
digital ASR DECwriter II incorporating paper-tape reader punch. From £18[illegible]
Acoustic coupler. From £[illegible]
digital LA180 DECprinter I From £1600
SYSTEMS
digital LSI-11 Modules — ex stock
digital PDP 11-03 with order processing/stock, nominal ledger, purchase ledger, sales ledger From £1395[illegible]
Wilkes Computing Ltd
Bush House, [illegible]
Tel (0272) [illegible]

DoI funds micros teaching programme

A PROGRAMME to help schools and colleges to understand and make use of microelectronic technology, and to develop microelectronic engineers, is being developed at the Department of Education and Science.

A two to three year programme of seminars intended to reach 50,000 senior industrialists, trades unionists, public sector bodies and educational establishments, is also planned. Both moves are being made under the Department of Industry Microprocessor Applications Project, MAP (CW, July 13).

MAP had an initial budget of £15 million, with £2 million allocated for education. More than £2 million has already been promised for education, including £1 million a year for three years to the National Computing Centre to set up and co-ordinate the series of seminars; and [illegible] consultants have already been authorised.

Under MAP, £13 million is allocated for support, grants of up to 25% of projects requiring the use of micros. There have been 94 applications for projects totalling £14 million.

So far, 17 projects totalling about £4 million have been approved, and awarded funds of £1.25 million under MAP. The projects cover large and small companies and range from such as microprocessor controlled Hornby model railways, to machine tools.

The feeling in government circles is that the US and Japan are clearly ahead in the technology, and that Germany and France may have a lead over the UK.

High technology creates jobs—IBM chief

OVER the past 25 years, high-technology industries have created nearly nine times as many new jobs as low-technology industries, says IBM chairman Frank T. Cary.

Addressing the monthly American Chamber of Commerce lunch at the Hilton Hotel, London, last week, Cary underlined the contribution made by high-technology companies to the US economy by referring to "a recent study."

"In increasing output per employee, the high-technology industries outperform the low ones two to one," he said. "In producing real growth, they outperform them nearly three to one. And in holding down price increases — and thus inflation — they outperform them six to one.

"When so much depends on technology, competition and productivity, I believe that IBM is fortunate to be part of a high-technology industry which is both highly competitive and highly productive.

"Computations which cost $1.26 in 1952 on an IBM computer cost only seven-tenths of one cent today. Adjusted for inflation that is a productivity increase of 400 times."

Referring to the nine-year-old anti-trust suit brought against IBM by the US Justice Department, Cary pointed out that not a single product manufactured by IBM today was on the market when the suit was first brought. "I think by every test the Justice Department suit really is an anachronism."

Cary was in London for a joint meeting of boards of IBM Corp, IBM World Trade and IBM UK.

"We are proud indeed of the contribution IBM is making to the UK economy," he said. "Since our last board meeting here in 1972, IBM UK has increased employment by more than 2,000 people to 14,800, and also tripled our capital investment. Last year we paid £53 million in British taxes, and purchased goods and services worth £71 million from more than 10,000 UK suppliers.

"Last year IBM UK exports contributed more than £250,000 to the UK's balance of trade," he added.

Cary

Jokes of Chairman Cary

ALTHOUGH much of Frank Cary's address to the American Chamber of Commerce lunch was concerned with the distressing state of the US economy — nearly all economists are predicting that 1978 will be a year of slow growth or possibly recession in the US, and IBM's own economists forecast 2½% growth and 7½% inflation — his view of the future was optimistic, and he spiced his speech with humorous asides.

Referring to the enormous current account budget deficit being run by the US government, Cary noted that American babies cry louder than ever these days.

"They come into the world naked and hungry — and they are already $3,000 in debt."

On the parlous state of the US dollar: "Even my daughter now demands her allowance in Deutschmarks," he said.

And referring to the growing realisation that government was spending much too large a portion of the national income, he told of a senator visiting a college campus.

"How can I get started in politics?" asked one student.

"You've already started," drawled the senator. "You're already spending someone else's money."

Aid to language translation

TRANSLATION of foreign languages by a human assisted by a computer is the function of a new system unveiled this week by Weidner Communication Systems of La Jolla, California. Rather than trying to tackle the intractable problems of complete machine translation, this equipment works interactively with human translators and is claimed to increase their productivity by a factor of four.

The system runs on a Digital Equipment PDP-11/34 with four DEC VDUs, and at present can only translate Spanish and English. The Spanish is typed on the keyboard, and the Spanish words appear on the top half of the screen. Simultaneously, a word-for-word literal translation appears on the bottom half of the screen, the translations coming from a disc-based dictionary. Using text editing functions, the translator can then rearrange the order of the words and correct the choice of words where necessary. This is much quicker than writing out all the words from scratch.

Where a Spanish word could be any one of several English words, all the possibilities are displayed and the translator simply deletes the unwanted ones. When he is satisfied with the final product, it is typed out on a Diablo daisy-wheel printer.

As an example of the translation process, a Spanish sentence such as this: "Pero Odense es mejor conocido por el mas celebre de sus habitantes" would appear on the lower half of the screen as: "But Odense is mejor known (by/for/through) the more famous (of/from) (his/her/yours/its/ inhabitants". The translator would edit this to "But Odense is better known for the most famous of its inhabitants."

The dictionary is held on two 20-Megabyte discs. A four-station system costs $150,000, considerably less than the mainframes currently used for translation. Further languages will be added later, being loaded on to the machine from magnetic tape.

The system was developed by the Eyring Research Institute in Provo, Utah, an off-shoot of Brigham Young University. According to Ted Crowther, director of the Institute's Computer Sciences Division, one of the machine's most useful attributes is its complete consistency, in contrast to a team of human translators on their own, each one of whom will produce different versions of the same original. Consistent translation of specific important words is particularly important in applications such as banking, he says.

Weidner calls the machine the "Multi-Lingual Word Processing System," and is unveiling it this week at the convention of the American Translators Association in New York.

Cramer UK sale likely

UK subsidiary of the big American electronic components distributor, Cramer, will probably be sold to the UK management within two to three months.

Managing director of Cramer Electronics in the UK, Dave Griffin, says negotiations are nearing completion, though the financial terms have not yet been concluded.

The company is one of the leading suppliers of microprocessors and related components in the UK, handling such semiconductor manufacturers as Motorola and Zilog.

The move which, according to Griffen, was initiated by the UK management, follows the sale by the US parent company of its Italian subsidiary to the local management there.

Though Cramer in the US is reported to have run into considerable financial and management trouble, Griffen points out that the offer to buy the UK operation is not related to that situation.

Cray back in profit

UNDERLINING the business problems of running a company which makes only specialised computers, Cray Research has reported an operating profit of $[illegible] million for third quarter 1978, which compares with a net loss of $867,000 in the corresponding period last year. Turnover was $9.2 million, compared with only $533,000 in the same period of 1977.

The reason for the dramatic turnround is that the company sold one Cray I computer during the quarter, whereas it failed to make a sale in third quarter of 1977. Adding in a tax-loss benefit, net profit for the quarter was $3.4 million.

For the current period, Cray does not expect a comparable improvement in performance over the last quarter of 1977.

Blue Book back

THE operating manual for the Statistical Package for the Social Sciences on ICL 1900 computers, which is known as "The Blue Book" and has been out of print for some time, is to be re-issued a final time.

Anyone wishing to order a copy should do so to: Leslie Matenczuk, University Computing Service, Leeds University LS2 9JT, before November 16. The price will be £12.70, or possibly less if a large number of orders is received.

ACOUSTIC COUPLERS
Ex Stock £134 24718

Contact
MOORE REED & CO. LTD.
Walworth, Andover, Hants.
Tel. Andover [illegible]

Inmos may set up centre in Bristol

BRISTOL is one of several locations currently being evaluated by the National Enterprise Board's new semiconductor company, Inmos, for its UK technology centre. But contrary to recent press reports, it has not yet been selected as the site.

This was made clear last week by UK director, Iann Barron, who said that it would be another two months before a decision is reached. He did, however, list the qualities being sought by the company in its search for a suitable location.

"It must be a place where we can attract qualified staff," he said, "preferably a city, with good educational and cultural facilities, and inexpensive housing."

A similar search is being made by the company in the US, for a site for the combined technology centre and US headquarters. Some American sources tip somewhere in Colorado as a favourite.

National Semiconductor is now entering the computer market with a range of sophisticated system-level products. This step is not only natural and logical but inevitable.

For the past decade, we've been a leader in creating the technology that makes computers work.

Two years ago, we unveiled our first advanced system computer. To date, over 150 of these IBM 370 compatible systems have been installed in fifteen countries. We are now shipping worldwide more IBM 370 compatible computers than all other competitors combined.

And, by applying current semiconductor technology and production expertise, we deliver better performance at a lower price than other suppliers.

By making software-compatible hardware, we protect a customer's investment in standardized software.

We are the world's largest independent manufacturer of IBM 158 and 168 add-on memory and we have already started to manufacture for 303X Systems.

If you would like to know more about our current product range please complete this coupon and return it to us.

Sherwood House, 176 Northolt Road, South Harrow, Middx. HA2 0EB, U.K.
Telephone: 01-422 5612

I would like more information on
IBM Compatible Systems ☐
IBM Compatible Memory ☐
Name
Title
Company
Address
Tel:

National Semiconductor Corporation
Computer Products Europe

by Chad

Marriage à la modem?

GET ready for my weekly aaaaarrggghh! (They seem to be coming even more frequently than that nowadays.) Two sociology lecturers at the University of Utah have developed a marriage simulation system to enable people to choose a partner "rationally and logically."

They call it Malesim, and if this conjures up images of simulated rolling pins and simulated mothers-in-law, I gather the system asks you questions about your "marital values and expectations, your general value system and prospective partner's values." It matches your answers with those of prospective partners, and tells you whether the marriage would be successful or not.

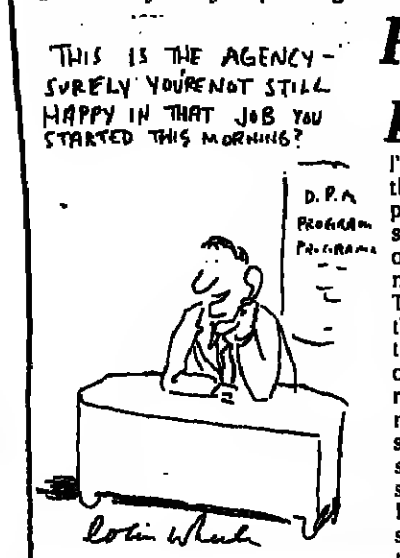
It even compares your answers with "a set of idealised values that marriage counsellors have determined lead to a successful marriage."

The questions you are asked about yourself and your ideal partner concern physical habits, characteristics, personal habits, economic orientations, sexuality, personality characteristics, television viewing habits, job mobility, child discipline, "attitude toward life," and so on.

Reading about things like this is always very depressing for a humorist. You think up the most fantastic, absurd notions for your column and then you discover that someone is taking the same idea *seriously*. If I dreamt up a piece about someone simulating love, and claiming that he had "determined" what it is that makes marriage successful, you'd say I was being too ridiculous for words.

It all sounds strangely reminiscent of something, doesn't it? Yes, you're right — computer dating, which is singularly unsuccessful, according to all my observations. (We were talking about this at an installation where I used to work, when the chief programmer, who was not noted for his social flair and irresistibility to women, chipped in with, "I tried computer dating when I was at college." Quick as a flash, the unkind R&D manager replied, "What did you get — a 360/40 on casters?")

It's nice to see that the system is very flexible, to allow for the varying requirements of the user population. For example, staff at the Mormon Brigham Young University changed the questions about sexual values to ones on spiritual values, these being "more significant" to the students there.



Pre-paid publicity

I'M SURE you will agree that the foundation of Britain's pre-eminent position in the advanced technology race is our aggressive, imaginative, no-expense-spared marketing. Take, for example, an advertisement placed by Digico in the Financial Times. The firm offers to send you a FREE reprint of a computer magazine's appraisal of their award-winning minicomputer, *so long as you send them* a *stamped addressed envelope*. Perish the thought that they should spend 7p on a prospective customer!

LEASED LINES

What with the excitement of setting up the new offices in St. James's and buying a 3 megabyte 370/158 from an Italian bank, J.R. has gone power crazed. Now he wants to set up a computer dial-up service so that we can have instant access to clients' needs and exchanges. I suggested a blackboard and chalk and a kind of hurt look came over his face akin to that of a religious zealot. I suppose we shall do it soon and will let you all know.

M.R.D. bought and sold some Model 518M tape drives last Thursday and this is developing into a good line for us.

370/148s are a very good buy at the moment and we can offer a selection for you. The base price is 60% of IBM's new price. This means we can lease a 1 megabyte 148 to you for the astonishingly low price of £7,999 per month over four years. You can buy, lease or take a conditional sale — with or without Government capital allowances. So, if you can't wait for the new "E" series, give us a ring.

J.R. has some 3420 Model 8 tape drives and 3330 disk drives for sale. M.R.D. wants to buy 3350 disk drives. Me? Well I just want to sell that 370/158 to pay the rent.

Will write again next month.

M.P.H.

COMPUTER CAPITAL

2-4 KING STREET, ST. JAMES'S, LONDON SW1
TELEPHONE 01-930 0361 TELEX 897948

2-4 KING STREET, ST. JAMES'S, LONDON SW1
TELEPHONE 01-930 0361. TELEX 897948

THE IMPACT OF THE MICRO

The public debate about the impact of information technology has generated much hot air and many alarming warnings about the likelihood of the micro leading to massive unemployment, or has fed glowing hopes that it will be the dawn of an entrepreneur-led Industrial Renaissance.

When the debate moves from theory to reality, it is clear that the trade union movement is going to play a major part in shaping Britain's response.

One of the most active trade unionists in this sphere has been Ian Benson (right) national officer for Tass, the white collar section of the Amalgamated Union of Engineering Workers. Benson is a member of the Neddy computer sector working party, and proposed a motion at the Labour Party conference last month proposing more effective government planning to cope with the introduction of new technologies. In this interview with Computer Weekly editor Malcolm Peltu, Benson discusses significant points.

Key roles for training and public ownership

THE most significant result of the current flurry of activity relating to "the impact of the micro" is likely to be a major restructuring of some of Britain's educational and training institutions — and the bringing of more information technology industries under public ownership.

That is the view of AUEW/Tass national organiser Ian Benson, who has been prominent in much of the "micro revolution" activity. While few who have examined the problem will question the need for new initiatives in training and education, the nationalisation of information technology is a proposal which will face stiff opposition.

Benson acknowledges this in his references to the Labour government, which he hopes to see re-elected, despite some powerful misgivings.

When workers are made redundant in a company because of the introduction of new computer-based technologies, more thought should be given to retraining them to take over the computer system development jobs currently undertaken by "subcontracted" systems houses, according to Ian Benson.

On what he refers to as "the politically neutral ground of training and education", Benson said there had been "an enormous change of attitude" within the government over the past year.

"For the first time, the minds of those with responsibility have been brought to bear on the problems." But on the question of increasing public ownership, Benson said he feared the Labour government had a "lack of political will."

The Labour manifesto for the next election is the place where Benson hopes to see a commitment to some of the points in the motion he proposed, and had unanimously accepted, at the Labour party conference last month, which called for more effective government planning for the impact of new technology and for more state intervention in the industry itself.

Benson's strong left-wing opinion and some of the views he has expressed on the Neddy computer sector working party, particularly relating to his desire to have more protection for the British minicomputer industry and to try to make computer services companies more closely oriented to British manufacturers (CW, November 24, 1977), had made Benson something of a bogey man in the industry.

Yet his emphasis on the importance of training and education will be echoed by many of his sternest critics in Neddy.

The goal, Benson said, should be continuous education geared in some way to the overall needs of the country, as well as individual career needs.

"The main aim of Neddy over the next year should be to influence the government and bodies like the Manpower Services Commission and the industrial training boards to do something positive to ensure that there is a co-ordinated strategy linked to industrial requirements so that there is no long term shortfall of staff with the technical skills that will be needed," he said.

One of the most urgent actions needed, he believes, is the establishment of some new central body with power to allocate resources to education and training where needed.

If the Labour government remains in power for another year or so, Benson believes there will be some major changes in the nature of the institutions responsible for education and training. Under the Tories, however, he believes the changes will happen at a slower pace.

Political points such as these are seldom far from Benson's view, because he sees politics as being intimately bound with the whole issue.

He believes, for example, that there should be a "statutory right to continuous 'training'", and that there should be "collective agreements" to ensure that staff are provided with the opportunity to undertake "lifelong" training that will be of assistance in that person's career.

But he stressed that such courses must have "strong links to the country's industrial needs", and must be viewed as a co-ordinated plan, not an ad hoc one.

In order to achieve this, he believes the traditional education process is "slow and inadequate", but he is encouraged by moves such as the development by the Engineering Industry Training Board of more modular systems of qualifications, which move away from the idea of "time-serving apprenticeships."

The need for training and improvements in education were perhaps the most significant recommendations of the Advisory Council for Applied Research and Development working party on the impact of semiconductors (CW, September 21), which has been just one of the plethora of committee and task forces that have been established this year to look at the impact of micros.

Was Benson afraid that the public discussion on the micro which has reached a peak over the last few months could prove to be a short-term media event and that, after the reports from ACARD, Neddy, et al, all the activity would die down?

"No, I am not," Benson answered firmly. "This debate has struck a nerve in the social fabric and will not go away. It has made people more aware of the connection between apparently disparate events such as the decline of the old watch industry, and the non-appearance of a national newspaper."

The connecting thread is, of course, the technology. But Benson also sees an important link between the technological debate and the central argument on the wider political scene — the question of state intervention in industrial policy.

This, he said, goes beyond just the issue of the ownership of the means of technological production and into the question of how wealth generated by new techniques can be distributed to meet the needs of a society where some traditional beliefs and concepts of employment opportunities will be challenged.

"We have suffered from a hegemony of rule by economic pundits who have believed in the formula that technical change equalled increased production which would mean increased demand," he said.

But the potential that the micro, computers and automation give to increase manufacturing productivity with significantly fewer people could "change the focus of economic activity" so that "employment was no longer necessarily seen as a good in itself."

He went on: "I believe that it is important to have public ownership of technology-based industry and for the state to channel resources to wealth-producing areas fuelled by the technology.

"The state can then distribute the wealth to nourish the human factor, through education and the social services. After all, one of the main elements of wealth creation comes from the collective intelligence of the workforce. It therefore makes both economic and social sense to raise the level of education, not only in schools but through an increase in life-long education.

Legislation to ensure that the workforce is consulted before new technology is implemented would not be of much practical benefit, according to Ian Benson. Employment minister Albert Booth said he was in favour of such legislation (CW, October 12) but Benson said that such a requirement was best enforced "by collective action" and should not be left to the law.

"There must be an enormous transfer of wealth, co-ordinated by the state, into accelerating the development of human resources through the education and training system."

He does not, however, agree with fellow trade unionists, such the ASTMS general secretary Clive Jenkins, who say that information technology should be seen as an opportunity for moving towards a "leisurely society" where it will be expected that most people, most of the time, will no longer be employed to do paid "work."

"It is all very well having an image of a kind of Southern Californian Utopia but the proponents of that goal seem to have only a vague idea of how we will get there.

"People do not want to be educated to sit on their backsides, and to start trying to prepare people for a future in which there will be less work is likely to create job insecurity."

Like many capitalists of whom he is so critical and also the former Tass member, Employment Minister Albert Booth, Benson would lay more stress on wealth creation rather than dreaming of all-year-round Christmas.

"In the future there will be an increasing proportion of the population, including a growing number of retired people, who will not be involved in productive employment. If we are to avoid a total breakdown in living standards we must find ways of growing the economy."

The unions, however, are often criticised for being a block on finding ways of improving the efficiency of British industry and there are many examples such as in Fleet Street, where union resistance has slowed down or halted the introduction of new technology.

Benson replies to this [illegible] by suggesting that it is [illegible] to draw any overall conclusion because the reaction of the workforce to the introduction of technology "depends a lot on particular circumstances."

In other areas, such as computer aided design, computers can enhance a job and he believes agreements on the introduction of new technology will be reached, with an increasing emphasis on "quality of life" rewards, such as lower working hours and retraining, rather than purely financial ones. He believes that people will be looking more for "career security" than just job security and that a life-long national education and retraining programme could play an important role in making workers more open to the introduction of new technology, as well as increasing the availability of those with the skills to use and implement it.

He recognises also that the technology could create [illegible] friction and new kinds of demarcation disputes as the old "craft industries" decline and there is the creation of new skills and the amalgamation of a number of previous functions.

That is why, Benson said, Tass joined AUEW in the early 70s so that any disputes could be "more easily reconciled" within the union "to meet the collective need."

And whatever the pundits may predict, the future effectiveness of British industry [illegible] creating the wealth that [illegible] sustain any shifts in work [illegible] leisure patterns will be largely determined by the way bargains are made [illegible] between the more powerful [illegible] and management.

Users hit out on all sides in BCS three-year survey

By Malcolm Peltu

SUCCESSFUL use of computers in the future will depend on improvements by manufacturers and users in the stability of systems, better implementation of standards and improved training to increase the quantity and quality of computing professionals.

That is the main conclusion of a survey of users conducted over the past three years by the BCS, involving the views of the 27 organisations representing a wide spectrum of users.

As reported (CW, April 6) the resultant report* criticises the user-manufacturer interface as well as indulging in an all-round flagellation of all sides of the computing world.

To an outsider, the report reads like an indictment of all things relating to computing development and does not speak well of the attempts of the BCS itself over the last 21 years to improve the professional image of computing people.

But to anyone in the computing world it contains little that is new, although it provides a service by cataloguing some of the classic computing horrors and recommending some positive actions, even though it is difficult to see why these calls for action should succeed when similar ones in the past have failed.

For example, on standards it makes the familiar calls for intensified activity by international standards bodies, with increased user participation and more vigorous government procurement action in insisting on standards.

Yet it suggests that all existing groups trying to achieve a unified user voice, such as the National Computing Centre and user groups, have proved to be inadequate.

As Donald Moore, of management consultants Peat, Marwick and Mitchell, who chaired the committee which undertook the study, says in his foreword, "The action that is recommended in the report covers a very wide field. To be effective it will need the encouragement of governments and some altruism on the part of the computer manufacturers and professionals who occupy established positions."

The following is a summary of some of the report's conclusions:

- **Cost and performance:** Most of the points raised by users relate to specific difficulties which they have experienced with past and current products of the computer hardware, software and service industries, and which they would like to be remedied in future. While market forces can resolve many of the problems, it was felt that there are some product areas where it would be valuable if a mechanism could be established to examine, with users' help, what further action might be taken to ensure that their reasonable aspirations are not frustrated by monopoly, or by market dominance.
- **Users' need:** There is a general sense of exasperation among users over the mystique surrounding computing equipment and practices.

Hardware unable to operate in an ordinary office environment, software imposing arbitrary limitations and heavy operating overheads, and program packages which perform less than users require, are examples of numerous ways in which users believe that suppliers are failing to respond adequately and sensitively to their needs.

Users are weary of phrenetic innovation, and all the expensive and disruptive changes it has involved for them. Although they do not ask for development to cease, they do ask for action that will establish a period of stability which will be characterised by longer economic lives for their systems, and by an evolutionary continuity in design which will protect their investments.

A closely related requirement is for fewer standards, but more standardisation. This will give users a wider freedom of choice, and avoid their being locked-in to the suppliers of their installed systems.

Users are also looking for some action to relax the restrictive and unfavourable terms of contract imposed on them by suppliers.

- **Systems performance:** Too many users have been disappointed and dissatisfied by the performance of their computer systems. A significant improvement might be made by taking action to ensure that, in future, users participate fully in drawing up system definitions which will specify in detail precisely what requirements are to be met, and thus determine the work of the system designers and programmers.

Participation will not be possible for all users, especially the smaller ones, and some others will not wish to take part: it would, therefore, be valuable for professional bodies, such as the BCS, to consider how best to bridge the communications gap between lay customers, the appropriate specialists and the suppliers and to make these views known.

- **Mini- and microcomputers:** Users are concerned that the introduction of even smaller and cheaper mini- and microcomputers will spread the direct use of free-standing and desk computers to a great many first-time users who have had little training and no experience in system design, programming or operation. The result could be widespread inefficiency, errors and reduplication of work already done.
- **Specialist staff:** Users express considerable disenchantment with many of the computer specialists they employ, and consider it necessary to increase both the quantity and quality of the systems analysts, programmers and, to a lesser extent, the operators.

The quantity could be increased by taking action to improve the pay and working conditions and career prospects of in-house specialist staff; enlarge training facilities; improve productivity; persuade other staff, managers and non-computer specialists to train and transfer into computing, for a period.

The quality could be improved by taking action to: increase the relevance and applicability of computer education and training to users' actual requirements; discourage job-hopping by requiring applicants to provide evidence of having worked on projects to their completion; encourage the acquisition of qualifications (MBCS, for example) by persuading employers to recognise these as necessary conditions for recruitment and promotion into the more specialist posts.

*User Requirements in Data Processing will be published by the BCS on November 29, £15 for non-members of the BCS, £10 for members.

Voice of management

REPRESENTATION for the voice of user managers and action to ensure that there is some recognised way of making computing professionals accountable for the systems they implement, were two key issues raised by the BCS user survey.

In many areas, such as dealing with government bodies on standardisation, manufacturers on contracts and, increasingly, with unions, general management are said to feel at a disadvantage as existing bodies do not represent the view of management. The report calls for an organisation to be set up to express the collective management view "forcefully, cogently and objectively."

The report also concludes that the "total dependence of many large organisations on their computer systems" raises urgent questions relating to the approval and security of the system and of the accountability of those involved in developing it. It calls for an initiative by interested bodies to determine what action is needed to protect the interests of users and society at large.

'Computers are used to silence creativity of people on shop floor'

FAR from saving us back-breaking work, computers will have the same destructive effect on creative intellectual work as machines had on skilled manual work in the first Industrial Revolution. This is the view of Mike Cooley, shop steward at Lucas Aerospace and a director of the Centre for Alternative Industrial and Technological Systems (CW, February 23).

Cooley, a mechanical engineer who is also past president of AUEW (Tass), was speaking on "Computers — an Aid or an Impediment to Creativity" in the BCS lecture series, Computers and Society.

In addition to decrying the destruction of creativity, Cooley put forward the view that "computers are the Trojan Horse by which Taylorism is going to be introduced into intellectual work." By Taylorism he means "Scientific Management," whose inventor, Frederick Taylor (d. 1915), theorised that each worker should be told exactly what to do, any improvement he tries to make being disastrous to the overall schema.

As an example of this, Cooley described computerised design systems in which humans are forced to keep pace with the rate at which the machine processes data. This way, Cooley said, the human's creativity is eroded and he is "reduced to head-scratching status."

"We are being conditioned to accept a role subordinate to the machine," he said.

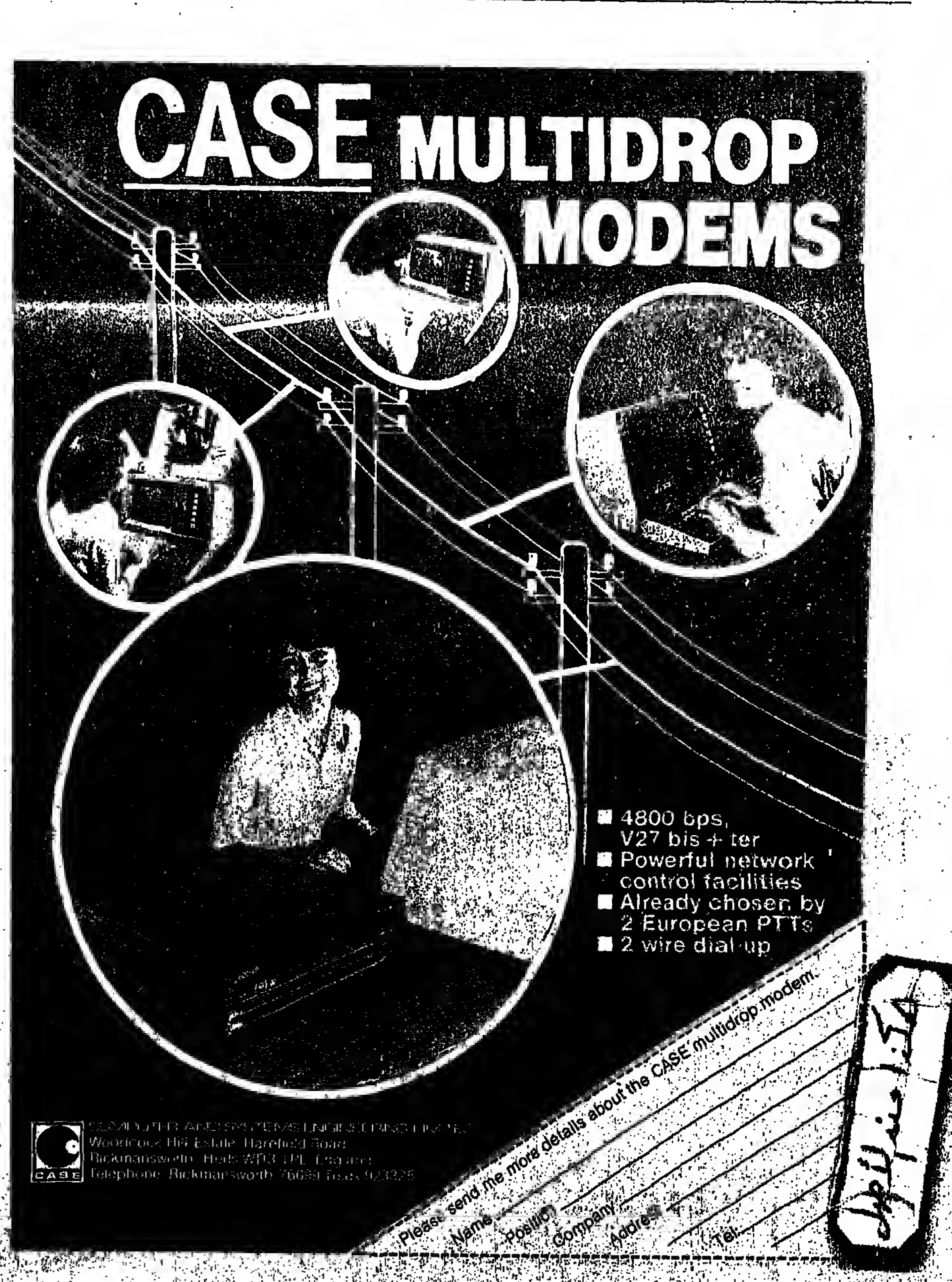
Cooley quoted an American management scientist talking about ways in which human behaviour in production systems can be controlled, placing human material on the same footing as physical raw materials. "There are many disadvantages in the use of human operating units," this scientist said, "and any system using them must incorporate appropriate safeguards."

Cooley expressed horror at this notion that human beings exist for the benefit of the machine — rather, he said, the machine should be designed for the benefit of the people. It is the computer that is becoming the centre of design activity, rather than the draughtsman, as in former times.

He described how the work of a draughtsman, skilled and creative, in transforming a mechanical designer's idea into the exact form of parts, was being taken over largely by mechanical draughting aids. He claimed that even architects are being "de-skilled" by the use of graphical computer systems.

"Computers are being used to silence the common sense and creativity of people on the shop floor," Cooley asserted.

He also claimed that over the centuries science and technology have acquired "built-in male values," such as drive, energy, and efficiency, and he would like to see more women in the field, to bring in so-called feminine values such as subjectivity and intuition.



GILB'S MYTHOLOGY

Let's take automation one step further

I STILL see it in books and articles: "Of course, well-written and detailed operator instructions must be produced as part of the documentation package."

This is a traditional hangover from the days when computer hardware was expensive compared with today, and the rate of processing work was slower.

My belief and practice is that all operator instructions can and should be integrated into the program. The system itself should be capable of giving all necessary operator instructions in the appropriate situation.

It should also be programmed to undertake a maximum of the checks and analysis which the operator is asked to do today. It should also double check that the operator has actually correctly carried out any actions the machine has requested.

To illustrate how far I would and do go, I'll mention the system where after the database backup tape is produced, the system requests that the file protection ring is removed.

The tape is remounted at machine request and the machine attempts to write on it. If it succeeds, then we know the operator has not removed the ring. Better to learn that now than in a recovery situation.

My operator procedures might well function within the framework of some operating system, but they are somewhat independent.

They are portable with my system, even when the operating system rug is pulled from under our feet. The controls are far deeper than the surface checks most operating systems perform, and the rejection of file mountings and program executions are more absolute and cannot easily be overridden by operators who are convinced they have the right file on anyway.

Frankly, any system which is designed to rely on a human operator or a generalised operating system is suicidal.

The principle of putting all operator instructions into the program extends to microcomputers. Given reasonable secondary memory such as floppy discs and the fact that most microcomputers become totally inactive if people don't know what to do, or have done it incorrectly, the case for building in all manner of help and instruction into the microcomputer is great.

It is only slowed down by our laziness in actually designing and writing the programs, which should not really cost that much more than equally good written documentation and which could replace it.

I am at a loss to think of any modern system where it would be a preferred design choice to write down an operator instruction rather than to build it into the programmed system.

Presumably there are exceptions, but I would much enjoy the Devil's Advocate position if any reader would care to state the case. Notice that we are not eliminating the operator from the loop, nor are we demeaning his competence.

We are simply automating the production of the relevant instructions at the right instant. We are making it unnecessary for the operator to read through a lot of material which is not relevant to the task at hand.

And we are putting the final responsibility for checking things where it belongs — with the system designer, the programmer and the machine.

In some designs I make use of the question-mark facility. This is even implemented in the hardware of some systems such as the HELP button on an IBM System 34, though little IBM software seems to be available to back it up yet.

Any class of terminal operator should be able to ask for help at any stage with the "?". He or she should get more detailed feedback than a simple hint, if the "?" is repeated.

In more advanced self-adapting systems, the use of the "?" should be logged in order to find system trouble spots. In some systems the user supervisors should be able to insert appropriate instructions on an as needed basis.

Let us push the concept of automation one step further.

Puzzler

THIS week's puzzle is submitted by Gilbert Watts, of Sale, Cheshire. He writes: A famous combinational problem is the possible number of derangements of n objects, a derangement being a permutation where no object occupies its original place, eg in how many ways can a postman put n letters through n boxes wrongly? The solution depends on a recurrence equation, and for n = 4 the number of derangements D = 9, and for n = 5 then D = 44.

The five directors of Alphabeta Systems went one better than this. After a celebration dinner in honour of a successful year, each man not only brought away the wrong hat and coat for himself, but also the wrong hat and coat for his wife. Moreover, the said pairs of hats and coats came from different couples.

The problem is, how many different ways is this double derangement possible within five people? See page 53 for solution.

THE INTELLIGENT SUPPLY SOLUTION

The full range of Tally printers; Visual display terminals by Hazeltine; Data recording products by 3M...

Everything ready for fast delivery, often from stock, at truly competitive prices.

They're all good reasons why Mancos is your intelligent supply solution.

Contact us soon.

Mancos Computer Services
269-271 Barlow Moor Road, Chorlton-cum-Hardy, Manchester M21 2GJ
Tel: 061-861 0757 Telex: 667151 SOSCO

MANCOS

PROGRAMMER NOTES

This week's Programmer Notes was discovered, like the Dead Sea Scrolls, by an intrepid explorer rummaging through some dusty areas (or what we in the business call a heap of paper in the bottom drawer). The author of this piece was identified on the dusty scroll; have in our possession, but would like to hear from anyone who can throw a light on its origins, indeed, significance.

The Gospel according to the Project Manager

IN the beginning the Project Manager created the Programming Staff. The Programming Staff was without form and structure. And the Project Manager said: "Let there be Organisation," and there was Organisation. And the Project Manager saw that Organisation was good: and the Project Manager separated the workers from the supervisors, and he called the supervisors "Management" and he called the workers "Exempt".

AND the Project Manager said: "Let there be a mission in the midst of the Organisation and let it separate the workers, one from another. And the Project Manager created the mission and he called it "The System". And the Project Manager separated those who were to benefit from The System from those who were to build it. And he called the former "Users" and he called the latter "Programmers".

AND the Project Manager said: "Let all the Programmers in the Organisation be gathered together into one place and let a Chief Programmer be brought up to lead them". And it was so. And the Project Manager saw that he was competent.

AND the Project Manager said unto the Chief Programmer: "Create for me a schedule, so that I may look upon the schedule and know the Due Date". And the Chief Programmer went among his staff and consulted with them. And the staff was divided into two parts, one part was called "Analysts" and the other part was called "Application Programmers". And the Analysts went back to their desks and estimated, as was their custom. It came to pass that each Analyst brought his estimate to the Chief Programmer, whereupon he collected them, summarised them and drew a PERT chart.

AND the Chief Programmer went unto the Project Manager and presented to him the estimate saying: "It shall take 10 months." And the Project Manager was not pleased and said: "I have brought you up from the depths of the staff: you have not grasped the Big Picture." And the Project Manager hired consultants, and authorised overtime and he spake to the Chief Programmer: "Behold, see all that I have done! The Due Date will be in five months." The Chief Programmer was much impressed and went from before the Project Manager and proceeded to implement The System.

AND the Chief Programmer sent his Analysts to the Users and said: "Let Specifications be written." And there were meetings, and lunches, and telephone calls. And the Specifications were written. And there was a Payday and the Happy Hour, one month.

AND the Chief Programmer examined the Specifications and saw that they were too ambitious. And he separated the mandatory features from the optional features: and he called the mandatory features "Requirements" and he called the optional features "Deferred" and the Users called him names. Lo, the Chief Programmer gave the Specifications to the Analysts and said: "Let the Requirements be analysed and let the Files be designated." And it was so. And the Chief Programmer said: "Let the Software Houses put forth their salesmen and let us have a Data Management System." And it was so. The Software Houses brought forth all manner of salesmen who presented their packages, and claimed wondrous things for them, each according to his own file structure. It came to pass that a Data Management System was selected: and the Chief Programmer saw that it was good. And there was a Payday and the Happy Hour, a second month.

AND the Chief Programmer said: "Let the system be divided into parts, and let each part be called a Module. And let programming teams be formed and let each be assigned to write a Module." And it was so. And the Chief Programmer created the programming teams with two levels, a greater and a lesser, and he called the greater the "Senior Programmers" and he called the lesser the "Junior Programmers". And he gave the greater dominion over the lesser. And the Chief Programmer saw it was good. And the Junior Programmers saw it differently. And there was a Payday and a Happy Hour, a third month.

AND the Chief Programmer said: "Let the programming be started and let much overtime be consumed, for there are but two months left." the Programmers, both the [Sen]ior and the Junior, were afraid, and they flowchart[ed ...] they ended, each in his own [...]ion. And the Chief Program[mer] looked upon the work and [liked] it not. And the Chief Program[m]er said: "Let there be [a] Standard," and there w[as a] Standard. And the Program[mers] looked upon the Standard [and] liked it not. And there w[as a] Payday and a Happy H[our, a] fourth month.

AND the Chief Progr[ammer] said: "Let there be Pro[gress] Reports, so we can monitor [...] control," and there were [Pro]gress Reports. And the C[hief] Programmer looked upon [the] Progress Reports and saw [that] the Due Date was not to [be ...]. And the Chief Program[mer] arose, pressed his suit, [...] his beard and went unto [the] Project Manager and gr[...] And the Chief Program[mer] pointed his fingers, and [...] Blame to issue forth u[pon all] manner of creatures who [...] Hardware and Software [...] the Chief Programmer [...] an extension.

AND the Project Ma[nager] was exceeding [...] and cast doubts upon [the] Programmer's ancest[ry ...] tered a multitude of [...] it came to pass that [...] sion was granted, and [the] Programmer took the Ex[tension] back to the programming [...] and there was much [...]. And the programming [of the] Modules was completed [...] There was a Payday and [the] Happy Hour, a fifth mont[h].

AND the Chief Program[mer] said: "Let the Modu[les be] integrated, one with anot[her, so] that System Testing may be[gin]." And it was so. And it ca[me to] pass that System Testing [was] completed. And there w[as a] Payday and the Happy H[our, a] sixth month.

THEN the Chief Program[mer] did go to the Pr[oject] Manager and said unto [him]: "Behold I bring you good [tidings] of great joy which will co[me to] all the Users, for on this [day the] System is completed." And [sud]denly there was with the [...] multitude of Users pr[...] Chief Programmer and s[...] "Glory be to the System [on] highest, but can you mak[e] one small change?" [...]

A major company in software services wishes to acquire the European rights to a suite of application packages for small business systems. Either purchase or royalty basis considered. Packages should be proven and preferably easily portable between minis. This is a genuine and urgent requirement by a company with a large marketing facility. Full details please and no triflers. All enquiries will be forwarded to our client. Please write, quoting Ref 127, to address shown below.

Clough Howard & Richards Limited
Elizabeth House, St. Peters Square, Manchester M2 3DF

Wilkes Computing Ltd.,
Bush House,
72 Prince St., Bristol.
TEL: (0272) 290851

SOFTWARE FILE

EDITED BY PETER HEWITT

Powerful version of IDMS launched

A NEW high-performance version of its database management system IDMS has been announced by the Cullinane Corporation, together with a data communications product and major enhancements to its Culprit report generator.

The company has at the same time revealed that it is to take over Mentel Inc, a small Californian software products company. The acquisition is the first to be announced since Cullinane's highly successful launch on the US Stock Exchange earlier this year (Software File, August 17).

Mentel's products, which Cullinane plans to integrate with IDMS, include systems for interactive text editing, word processing, and online program development.

Greatly enhanced efficiency in teleprocessing operation is the main feature of the new IDMS release, numbered 5.0. At field test sites, the enhanced software has achieved reductions of up to 80% in terminal response time, and 50% in elapsed execution time.

Much of this improvement can be attributed to the introduction of full multi-threading operation, the same innovation made by Cincom in its latest IBM-mainframe version of Total, release 8.0 (Software File, June 15).

Also contributing to faster execution is the provision of record level lockout. Protection against concurrent updates was previously implemented by locking at "area" level, which greatly increases the frequency of contention.

Other notable features of the new release are automatic recovery, warm restart, disc journaling, additional utilities, and an extended set of operator commands.

The new release also includes the nucleus of IDMS-DC, a teleprocessing monitor due to be released in the UK in the middle of next year.

Cullinane, which has not previously offered its own TP monitor, is understood to have implemented around 80% of the program handling task in the DMBS itself. The remainder, together with routines for mapping and screen handling, will be implemented in IDMS-DC proper.

A spokesman for Scicon, Cullinane's UK agent, noted that integrating TP monitor functions with the DBMS made possible a number of efficiencies, such as a single log file for both systems.

The DC nucleus functioned as a wait dispatcher and resource controller, he said, monitoring all online database activities and facilitating multi-threading. It would not, he added, duplicate the functions of existing TP monitors already installed, such as CICS or Shadow.

Enhancements in Release 4.5 of the IDMS/Culprit report generator include greater efficiency during multiple-report runs, greater use of the Integrated Data Dictionary, and increased flexibility for database reporting.

A new facility is the ability to generate data definitions automatically from the data dictionary. Saving considerable coding time, record parameters can be generated from the IDD for both IDMS and non-IDMS files.

All the enhancements are restricted to the IBM and Siemens implementations of IDMS. They do not apply to either the ICL or DEC versions, which are maintained by the companies themselves.

£½m profit for BIS

TURNOVER exceeding £5 million, with pre-tax profits of over £500,000, is expected by the BIS group for the year ending in February 1979. Last year, the group achieved £3.9 million turnover, with profits of £479,000.

MoD contract for Scicon

SUPPORT for the WG34 helicopter development is to be provided by Scicon Consultancy under a contract awarded by the Ministry of Defence. The firm is to build mathematical models simulating the operational characteristics of the helicopter.

The models will describe the performance characteristics of navigation systems, sonobuoy monitoring, tactical data handling and torpedo deployment patterns and overall system effectiveness.

ICL's 2900 Cobol may be adapted for 1900 series

ONE of ICL's "superstructure" products for the 2900 range, the C2 Cobol compiler, may be adapted by the company for its older 1900 series machines.

Users still developing 1900-type systems, whether for a 1900 or a 2900 under DME, would thus have the opportunity of writing forward-compatible application programs and minimising future conversion effort.

A 1900 version of the C2 compiler, which is said by VMW/B users to be of a very high standard, is reported to be under consideration by ICL as C2*.

Such a development would not only ease the migration path to 2900, but would also, in the view of one user, make available an excellent piece of software to continuing users of the 1900 range.

In contrast to its native mode operating systems for the 2900 series, which have attracted serious user criticism, many of the software superstructure products have been highly praised. Other language processors to have been specifically acclaimed include the Fortran FI and OFC compilers (CW, February 16).

Manager for multi-user interactive Basic

MULTI-USER Interactive Basic at a large number of terminals is supported by a new automatic systems manager on the ICL 2903 range of small computers. Called Minimac, it has been demonstrated with 32 terminals attached to a 2903, and was developed by ICL in collaboration with North Staffordshire Polytechnic and Falkirk College of Technology (CW, June 1).

Minimac supports terminal job entry and detaches jobs into from one to four batch streams according to the version of 2903 Exec with which it is used. Although primarily aimed at the educational market, Minimac is also expected to be of interest to the engineering departments of commercial companies.

The Basic provided with Minimac is compiled rather than interpreted. Although not yet announced, Minimac could also in principle be used on the 2950 and the new 2956 under the DME/2 emulation of the 2903 series Exec 3S operating system.

IBM release

AN online query system originally developed by IBM as part of its relational database project, System R, has been released by IBM in the US as an installed user program. The software, Query-by-Example, is said to run under VM/370.

Moves on European agency for Omegamon

A EUROPEAN agency is being negotiated by Candle Corporation, of California, whose main product is Omegamon, a real time monitor for IBM's MVS operating system. The agent, when appointed, will also be responsible for marketing the firm's background performance monitor, Epilog.

Omegamon, installed at around 100 North American sites, provides real time displays for use primarily by operators and system programmers. It is used interactively through a local 3270, which may be either a dedicated 3270 or a TSO terminal.

By means of mnemonic commands, the user can format a display on the screen to investigate such areas as CPU and device utilisation, TSO activity, paging and swapping, and SRM performance.

Once formatted, the display will be updated automatically on a dedicated terminal or in response to pressing "Enter" under TSO.

A major aspect of the system is automatic exception analysis. Intended to warn the operator of operating system or hardware problems, this facility reports such conditions as disc dropped ready, excessive swapping, excessive address space waits, looping jobs, and page data set errors.

A further significant feature, and an explicit design aim, is high availability. Omegamon continues to function after lockouts on the master system console, or lockouts caused by TCAM or Vtam.

Epilog, a more recent introduction by Candle, provides historic information on system performance for off-line use by performance analysts. The primary outputs are summaries of wait times, which the package is said to relate directly to hardware and software problems.

Epilog's principal use is thus in the analysis of system bottlenecks causing poor response time or low throughput. The system can also assist in the diagnosis of individual problems, such as a temporary increase in TSO response time.

Candle Corp expects to announce the appointment of European marketing and technical representatives for its products by the end of the year. As a possible guide to prices, Omegamon is sold under perpetual licence for $12,500 in the US, with a $100 fee for a 30-day trial period, and free use during conversion to MVS. No prices have been announced by the company for Epilog.

DBMS acquired

THE Croydon-based bureau Lowndes-Ajax Computer Service has acquired the System 2000 database management package. The firm is thought to be the first IBM-based bureau in the UK to install System 2000, which was developed by MRI Systems Corporation of Austin, Texas.

Yesterday's branch office

Today's*

Branch office of the future, but available now – that's the Model 745 Portable, from the "Silent 700"* series of electronic data terminals. It gives representatives immediate access to computerised data wherever there's a telephone and power point.

Just plug it in, link it to a 'phone handset and the 745 is ready to send or receive up-to-the-minute data. You can then make instant decisions based on reliable, accurate information.

In your customers' offices, for instance, the 745 can enter sales orders or print out complete reports in seconds on your stock, delivery times, prices or detailed quotations.

You can buy the 745 at attractive prices, or use our flexible leasing program mc. And you can depend on responsive support from TI's national sales force . . . with additional back-up from its distributor, TI Supply, to handle small quantity immediate deliveries.

The 745 means change . . . to greater efficiency and profit. Learn more. Call the nearest TI office, or complete the panel and send it now.

* And we mean today's. The 745 is available immediately. Just fill in the coupon and send it now.

TEXAS INSTRUMENTS LIMITED
European Digital Systems Division,
Data Terminal Marketing, MS33A,
Manton Lane, Bedford MK41 7PA. Tel: 0234 67466. Telex: 82178.
Stockport Tel: 061 442 8448 Slough Tel: 0753 35545

Name ____________ Position ____________
Company Address ____________
____________ Tel. No. ____________

745 2 CW 42 8

SILENT 700 electronic data terminals

The 745 Portable Data Terminal

*Trademark of Texas Instruments

PEOPLE AND EVENTS

Edited by Nancy Pocock

£1.3 million fund must go still higher

A FUND organised by a cancer patient to buy a CAT scanner for Manchester's Christie Hospital and Holt Radium Institute has reached £1.3 million in 18 months.

This amount would buy several scanners. However, the fund cannot close yet, as it must cover the cost of a new building and of staffing and maintenance for the next 10 years, as well as buying the actual machine.

"If you can tell me how inflation is going to run over the next 10 years," said Mrs Pat Seed, the fund organiser, "I'll tell you exactly how much we are going to need."

A journalist before her illness, Mrs Seed found her previous experience of fund-raising useful when starting the Christie fund. It now has 68 local committees throughout the North-West, many of which are run by former cancer patients or relatives of patients.

The decision on the make of machine to be bought is expected this week.

Cheryl Garner has been appointed project leader with Gemini. Until recently she was a systems analyst with the Metropolitan Police. **Leon Opit**, previously with Quadrant Software, has joined Gemini as a programmer on DEC-based systems.

Computers and the Nurse

ON November 14, the Irish Computer Society's Health Care Specialist Group will meet to hear a presentation on Computers and the Nurse in a Hospital Environment.

The talk will be given by Clare Ashton who is senior systems designer at Queen Elizabeth Hospital, Birmingham, at 6.00 pm, and will be followed by an open forum and refreshments.

The venue is Trinity Medical School, St James's Hospital, James's Street, Dublin 8.

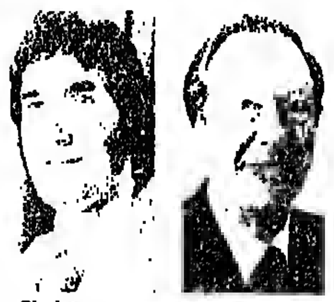
Andrew Jenkins, formerly senior development engineer with Memory Devices, has joined Burr-Brown International as a senior applications engineer.

Barbara Powell has joined Jenson Computer Systems to demonstrate and instruct in the use of the Word Eleven and other systems. Previously she worked in the Bertram Group's bureau in Birmingham. **Paul Wyllie** has joined Jenson as a trainee programmer. He recently got his HND in business studies, data processing at Bristol Polytechnic.

Roberts Moore

John Roberts, from the Welsh Development Agency where he was a management accountant, has been appointed bureau manager of the Monmouth branch of Mills Associates. **Edward Moore** has joined Mills as manager of the North-East London bureau. He was previously operations manager of Sherwood Computer Centre.

Dermot Eustace has been appointed marketing services manager of Gould Instruments Division. He was formerly advertisement manager with the journal Electronics Industry.



Clarke Wright

Austin Clarke, previously computer development manager with Scandura, has become computer manager of Yorkshire Post Newspapers.

Peter Wright, director of international operations with Datatrol Inc, has been appointed in addition managing director of its new European subsidiary Datatrol Applied Devices Ltd. Datatrol Inc is itself a subsidiary of Applied Devices Corp.

Ralph Smith, formerly sales manager with Muirhead Vactric Components, has joined Walmore Electronics to become manager of the newly-formed display division.

Grafton, Munich

THE terminal sales and software consultancy firm Grafton has opened an office in Munich. Grafton is owned by British and Swiss companies and operates in the EEC.

Associate consultant at the branch will be **Nicholas Lord**, who will be in charge of software conversion projects.

The address is Grafton mbH, Filiale Muenchen, Postfach 820304, D-8000 Munich 82, W. Germany. Telephone: (089) 4303092.

Mond Aikan

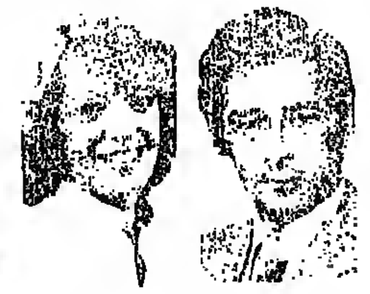
John Mond, previously assistant sales manager in Sperry Gyroscope's land systems marketing department, has been promoted to sales manager.

Barry Aiken has joined Memorex as personnel manager. He was formerly personnel officer with British Titan Products, and before that was personnel manager, North, with Univac.

John Weatherhead, until recently customer services manager of Rapid Recall, has been made marketing director, a newly-created position.

Bernard Conn becomes Southern area director of Sales and Marketing Services, with special responsibility for the London office of Sales and Marketing Recruiters. He was previously South Thames branch manager for Burroughs.

Barry Savery, group financial director of the Harland Group, has been appointed managing director of Harland Data Systems. **Peter Skinner** has become European sales manager and **Roger Birkin**, formerly R&D manager for Harlands of Hull, is now UK sales manager of Harland Data Systems.



Grace Lindblom

Susan Grace and Bob Lindblom have been appointed branch support managers with Redifon Computers. Grace, who takes on the South-East branch, was formerly a senior systems analyst with Redifon, and Lindblom, who takes the Southern branch, was a regional computer installation manager with the North-West Thames Regional Health Authority.

Weatherhead Conn

Bill Bindle, who has been appointed European industry marketing manager with Modcomp, was most recently marketing manager for manufacturing industries within Digital Equipment's industrial products group in the US.

Inforex Midlands office

Winter

A MIDLANDS office has been opened by Inforex, and will cover sales and service in Derbyshire, Herefordshire, Leicestershire, Northamptonshire, Nottinghamshire, Staffordshire, Warwickshire, West Midlands and Worcestershire.

Joining the company to manage the new office as Midlands area manager is **David Winter**, who previously held a similar position with Redifon Computers. **Cron Ager**, formerly a senior salesman with Business Computers Ltd, joins the new Inforex office in the same capacity.

The address is 35 High Street, Lutterworth, Leics, and the telephone number is (04555) 56321.

Soccer

Results:

Division I
Gryphon 2, SIA 1
Jadpu 0, SIA 6

Division II
Lambeth 0, Allen 5
Datasolve 5, John Lewis 0
John Lewis 5, Lambeth 0

Division III
IPC Victoria and Gill & Duffus withdrew from the league and so the Division III sides they did not play were awarded 5-0 victories.

Division IV
UCSL 8, Computer Wkly 0
Wellcome 5, Targa 0
UCSL 5, Bunzl DS 1
Targa 0, Bunzl DS 6
Wellcome 3 C. J. Bees 0
Computer Weekly 9, UCSL 0
Bunzl DS 5, Wellcome 0
Targa 0, Computer Wkly 5

Division V
CDC 4, Hoskyns 1
Jadpu 8, Allen 1
Allen 1, Sherwood 2
Hoskyns 1, Sherwood 3

Tables

Division I

	P	W	D	L	F	A	Pts
Gryphon	10	8	1	1	32	9	17
Jadpu	10	5	1	4	32	22	11
Sia	9	5	1	3	24	26	11
Datasolve	9	3	2	4	14	20	8
Com-Data	10	2	2	6	16	23	6
Rank Xerox	10	1	3	6	17	35	5

Division II

	P	W	D	L	F	A	Pts
Allen	10	7	3	0	27	11	17
Allen	10	5	3	2	31	12	13
John Lewis	10	3	3	4	26	25	9
Datasolve (Reg)	10	3	3	4	21	24	9
ICL	10	3	2	5	20	27	8
Lambeth	10	1	2	7	9	34	4

Division III

	P	W	D	L	F	A	Pts
Auto	10	7	2	1	40	15	16
Datasolve (W1)	9	6	2	1	33	17	14
IBM	10	6	2	2	36	17	14
IPC Vic	10	2	1	7	27	36	5
Rank Xerox (London)	9	2	1	6	19	38	5
Gill & Duffus	10	1	0	9	4	47	2

Division IV

	P	W	D	L	F	A	Pts
Computer Wkly	10	6	2	3	36	22	14
C. J. Bees	10	6	0	4	25	25	12
Targa	10	4	1	5	60	36	9
Bunzl DS	10	4	1	5	22	31	9
UCSL	9	4	0	5	24	35	8
Wellcome	9	4	0	5	24	35	8

Division V

	P	W	D	L	F	A	Pts
Sherwood	7	7	0	0	21	8	14
[illegible]	7	5	1	1	29	16	11
Allen	8	2	3	3	30	22	7
Jadpu B	8	1	3	4	17	12	5
Hoskyns	8	0	1	7	11	36	1

Calls for papers

THE University of East Anglia's conference on combinatorial optimisation will be held at the University on July 9-12, 1979. The deadline for the receipt of papers in a form suitable for publication is April 2; they should be no more than 1,000 words long, and should be sent to Dr V. J. Rayward-Smith, School of Computing Studies, University of East Anglia, Norwich NR4 7TJ, from whom further details may also be obtained.

PAPERS on real time data handling and process control are solicited for the first European symposium on the subject, to be held in West Berlin on October 23-25, 1979. Among the sponsors are the Commission of the European Communities, the International Electrotechnical Commission, and the International Organisation for Standardisation. The preliminary programme, a list of possible topics, can be obtained from Real Time Data 79 — Organising Committee, Attn H. Meyer, c/o Commission of the European Communities, JRC — CBMN, B-2440 Geel, Belgium, to whom 500-word summaries should be sent by December 30.

A CONFERENCE and exhibition on engineering software is being organised by Engsoft for September 4-6, 1979. The date for the submission of summaries, December 1. Further details may be had from Dr R. Adey, Engsoft, 6 Carlton Place, Southampton SO2 0LG.

COURSES

STRUCTURED Programming, November 13-17, Operations Research and Control, November 20-24, General Systems Analysis starting November 13, and Files and Data Bases, November 13-17 are some of the courses available from Hoskyns during this month. For further details contact the course registrar, Valerie [illegible]

DIARY

NOVEMBER 6

Applications of microprocessors in telephone exchanges, colloquium. IEE. Savoy Place, London WC2. 14.00. Register with Secretary, ref. LS(DA).

Planning and project resource estimating techniques. Neil Pebble. BCS E Anglia branch. Thomas Paine Hotel, Thetford. 19.00.

NOVEMBER 7

Experience in the use of computer terminals at the supermarket checkout. D. Harris. BCS NW London branch. Railway Hotel, Greenford, Middx. 18.30.

Practical approach to installing computers for purchasing and supply, conference Institute of Purchasing and Supply. Excelsior Hotel, Heathrow Airport, London.

Introduction to microprocessors. C. Blake. IEE Hatfield Section. Hatfield Lodge, Hatfield, Herts. 18.30.

Bench marks. BCS Birmingham Branch. Priory Dene Hotel, Edgbaston. 18.30.

NOVEMBER 7-9

Minicomputer forum. Bloomsbury Centre Hotel, London WC1.

NOVEMBER 7-10

Pattern recognition. 4th International joint conference International Association for Pattern Recognition. Kyoto, Japan.

NOVEMBER 8

Computer architecture. Prof Frank Sumner. IEE. Savoy Place, London WC2. 17.00.

Future of computing. Dave Firnberg. Association of Independent Computer Specialists. National Liberal Club, 1 Whitehall Place, London SW1. 18.00

Data dictionary systems, seminar. BCS Data Dictionary Systems Working Party. Imperial College, London SW7. Register with BCS.

Micros today. Justin Farder. BCS N London branch. West Lodge Park Hotel, Cockfosters. 19.45.

Visit to NPL. BCS Displays Group. Teddington, Middx. 14.15. Book in advance, 0483 71661, ext 47.

Problems of the computer operator, forum. BCS Kingston-on-Thames branch. Regional Management Centre, New Malden. 16.00.

Supersonic evening. BCS Kingston-on-Thames branch. Regional Management Centre, New Malden. 19.45 Tickets £1.50, W. F. Webb, 14 Titchwell Rd. London, SW18.

Holography, engineering applications. F. N. Bukett, IEETE, Dept of Mechanical Engineering, Loughborough University. 10.30.

Telecommunications. Dr R. Rosner. Polytechnic of Wales/ BCS S Wales branch Polytechnic of Wales, Treforest. 14.15. Details (0443) 405133.

The role of the computer in river management. D. Hilder. BCS N Staffs branch. Post House Hotel, Newcastle-under-Lyme. 20.00.

Visit to JCB. BCS Wolverhampton branch Uttoxeter. Numbers limited contact G. Hamer, Wolverhampton 27371.

COTEN, the BSC network. F. Dewis. BCS Teesside branch. Teesside Polytechnic, Middlesbrough. 19.00.

Microprocessors in business. BCS Humberside branch. Willerby Manor Hotel, Hull. 19.30.

NOVEMBER 8-9

US Federal computer conference and exposition. Federal Education Programms/ Datamation. Sheraton Park Hotel, Washington DC, US

NOVEMBER 9

The interaction between computer technology and society, colloquium Joint IEE/IERE Computer Group/BCS/IEE. IEE, Savoy Place, London WC2. 10.00.

The use of structured techniques in system design. R. Robinson. BCS Kent branch. Computing Lab, University of Kent at Canterbury. 19.45.

Should computerisation be stopped? Ian Benson. BCS S Yorks branch/BIM. Royal Victoria Hotel, Sheffield. 19.30.

NOVEMBER 9-10

International technical marketing conference. American Institute of Aeronautics and Astronautics/Technical Marketing Society of America. Brussels.

NOVEMBER 9-11

Interact 78, computer strategies, planning for 1984, conference. BCS Belfast branch/ICS. Talbots Hotel, Wexford.

NOVEMBER 10

Data transmission codes, colloquium. IEE. Savoy Place, London WC2. 10.30.

Standardisation of real time programming languages. IEE. Savoy Place, London WC2. 14.30.

An introduction to APL. Al Rose. BCS APL Group. Sheffield Bldg. Imperial College, London SW7. 10.00. Details Peter Cyriax, ICL Dataskill, 00734 583696.

Interactive computing for research and development. Science Research Council/ IEE. Rutherford Lab, Chilton, Didcot, Oxon. 10.30. Details from Mrs M. B. Sharwen, Bldg R20, Rutherford Lab.

Computational processes as linguistic theories. Dr M. Steedman. Computation/ Linguistics, University of Oxford. Dept of Experimental Psychology, South Parks Road, Oxford. 17.00. Details: Mrs S. M. Hockey, tel: 0865 56721.

NOVEMBER 13

Microprocessors. Dr K. G. Pearson. Institution of Mechanical Engineers Applied Mechanics Group. IMechE, 1 Birdcage Walk, London SW1. 17.30.

NOVEMBER 14

Real time operating systems and languages, lunchtime workshop. Digital Equipment. James Watt House, Tottenham Court Road, London W1. 12.00.

Computers and privacy. Sir Norman Lindop. IEE. Savoy Place, London WC2.

Recent developments in computer security. Dr J. Horsey. BCS Croydon branch. Fairfield Halls, Croydon. 19.15

Structured programming. Ian Scougall. BCS Harlow sub-branch. Harlow Technical College. 19.30.

Flight simulation and other systems. Mike Grant. BCS Reading branch. Small Physics Lecture Theatre, University of Reading. 20.00.

Career prospects in the computer services industry. Alan Benjamin. BCS S Wales branch. Bear Hotel, Cowbridge. 19.00.

NOVEMBER 14-18

Mezura 78 (testing, measurement, automation), Interbiuro 78 (office equipment and DP) exhibitions, and international seminar week Management of the International Poznan Fair. Poznan, Poland. Details from IFG Industrie-Export-Interessen GmbH, D-5650 Solingen/BRD, POB 100 410.

NOVEMBER 15

VIS-NEWS. IDPM. Visnews, Cumberland Avenue, London NW10. 18.00.

Visit to American Express. BCS Sussex branch. Brighton. 10.30.

How to produce an operating system, perhaps. M. Wright. Dept of Computer Studies. Heriot House, Sheffield City Polytechnic. 14.00.

Software for the small machine. R. R. Woller. BCS Belfast branch. Wellington Park Hotel, Belfast. 20.00.

NOVEMBER 16

Computerised auditing, a US perspective. Donald Adams. BCS London branch. Waldorf Hotel, London WC2. 18.00.

Computer-generated art and music. J. Lansdown. BCS Guildford branch. Stoke Hotel, Guildford. 18.30.

Programming languages, Coral 66, Pascal, RTL/2. J. Fisher, M. Jackson, John Smart. BCS W Herts branch. Heath Park Hotel, Hemel Hempstead. 10.30.

Impact of information systems on organisational thinking. Bob Tricker. BCS Oxford sub-branch. Europa Motor Lodge Hotel, Oxford. 19.45.

Student evening. BCS Coventry branch. Lanchester Polytechnic, Rugby. 10.30

NOVEMBER 17

Computer simulation and psycholinguistics. Dr G. Cohen. Computation/Linguistics, University of Oxford. Dept of Experimental Psychology, South Parks Road, Oxford. 17.00. Details: Mrs S. M. Hockey, tel: 0865 56721.

D.I.Y. accountancy systems. Take a look at the alternative.

Speedy installation of ready made, proven, flexible accountancy packages at lower costs than custom made software. From NSC.

A suite of packages for standard accounting needs - general, sales or purchase ledger, invoicing or stock control. From NSC.

Packages that can be used integrated or 'stand alone'. Start with one and gradually change your accounting system. From NSC.

Available in 4 languages. Complete with full training and maintenance facilities. From NSC.

Save time, money and worry. Contact Northern Software Consultants.

Northern Software Consultants Limited, 15 Cross Street, Manchester M2 1WF. Telephone 061 832 9967. Telex CHAMCOM MANCHESTER 667822

nsc

NSC 1

LETTERS TO THE EDITOR

The case for the relational database

IN his article on System R (CW, October 19), Max Stewart claims that relational databases are "arguably the most significant development this decade," unfortunately without actually presenting any of the reasons for or against.

Why is a relational database so significant? I believe the answer is because it provides direct end-user facilities; personal systems for people whose profession is not computing.

The fact that "personal computing" is usually associated with microprocessors only serves to emphasise the impersonal nature of mainframes. In proportion to their cost, mainframes have a very low level of usefulness.

The "personal" market is essential to computer bureaux and suppliers of turnkey minicomputer systems, but has been badly neglected by mainframe manufacturers who sell primarily to a DP department. Consequently we should welcome IBM's relational database, since it would open the doors for other vendors.

Even without IBM, there are numerous relational-style systems available on minicomputers and via time sharing services and I see no reason why these could not be enhanced to compete with IBM once a large market has been established.

PETER GRAVE
Twickenham
Middlesex

Users' view on Fortran sought

I HAVE noticed that in a series of editorial columns (CW, August 25, 1977 to CW, May 11, 1978) you have emphasised that the views of computer users often go unheeded because users are not effectively organised. I would like to point to one area which overlaps the activities of groups such as manufacturers' computer users associations, where users and manufacturers, with the support of governments, are making progress in resolving some of their differences, namely the DP standards area. I would urge users to support these organisations.

Let's look at the benefits that follow the standardisation of a programming language such as Fortran. The standard represents a generally accepted (much disputed — but *accepted*) level of quality. By this we mean that it has a host of properties such as portability, efficiency, simplicity of use, reliability and expensibility that are important in varying degrees for the task for which it was designed. Users can ask for, and expect to get, products (such as compilers) that comply with the standard.

Once such a language becomes heavily used, the portability aspect becomes important for the user because increasingly users' software is becoming a larger investment than hardware and there is a requirement to ensure protection for this investment — so that when, eventually, a new computer system is procured, the existing software should not have to be discarded, but transported to the new hardware. The (profitable) life of a piece of software may well outlive several generations of hardware.

It is doubtful if any manufacturer can now introduce a new range of equipment which is not compatible with regard to its existing users' software without running the risk of losing customers. This is part of the evolutionary trend which followed a succession of computer revolutions which terminated with the introduction of the IBM 360 series of computers.

Because of obsolescence, currently Fortran is coming under increasing pressure from several more modern general-purpose languages and its long-term survival can only be ensured by an ability to compete effectively. As Fortran is not a general-purpose language but primarily one used for scientific, engineering and statistical computations, it is not competing in quite the same area and can afford specialisations that a general-purpose language might avoid.

The ANSI Fortran Committee have decided that Fortran should be further revised following completion of the Fortran 77 language. This will enable users to benefit from recent advances in hardware and software design.

How best then can users make their voices heard by standards bodies? The answer is simply by timely and informed comment. The word "timely" is important here, because the standards revision cycle of activity — i.e. specification, design, drafting, language implementation, user reaction — is basically sequential, and of a finite timescale. It is of little use having a proposal for a major new facility after the drafting phase. This may seem obvious, but to someone who might have spent considerable effort in formulating a proposal, to have it rejected on grounds of being ill-timed can only result in disappointment.

Currently work is directed to the specification of all major facilities and revisions to be included in Fortran 82, and this stage will be concluded within the next year. After that, it will be too late to make further major proposals and comment will be directed to ways of incorporating the chosen facilities into the language.

To enable Fortran users to put their points of view to members of the ANSI committee, a meeting with them will be held on December 1. Details are available from J. Roberts-Jones, Data Processing Division, City Treasury, PO Box 1, Liverpool L69 2DQ. Users should speak up now — the next opportunity for major revision will not be until after 1982.

P. A. CLARKE
Chairman
BCS Fortran S.G.

Variations on a pair of related cliches

HAVING read Angus McQuibble's article on DP cliches (CW, October 12) I was delighted to find a variation on my favourite cliche in the excellent letter from R. A. Rees (Letters, October 12), namely: "We can't have decisions taken by man or machine unless the process is fully understood by which the data output is reached".

With regard to man, I often understand badly how I make decisions myself. It is clear to me (but I wonder how it is), that most other people understand their own decisions even worse (this is an aid to decision making), and I think it is even harder to understand how somebody else makes a decision.

With regard to computers, this relates to another favourite cliche: "Computers don't think for themselves, they just do what the programmers instruct them to do". Rather early in my career, I became involved in the design of an operating system (G) where the latter half of this cliche was clearly untrue. (I have been unable to find a sensible true meaning for the first part either.)

I remember being asked by a programmer, what G should do in certain circumstances not mentioned in my enhancement design. Neither of us knew what would happen if no code was written for this case. G would wander off through some routines, take a decision and act on it, but what decision?

My advice was to test what G did and, if it seemed sensible, to leave well alone. This was done, and I believe never led to any problems. So nobody ever knew how that case worked. Such design techniques are rarely described and hardly fit in with correctness proofs, but are, I believe, sometimes appropriate.

May I also be permitted a few words to Ivor Catt on Computer Chess (Letters, October 12). He may well be right that a hardware breakthrough will lead to an AI breakthrough, but he underrates what can be done with current machines.

David Levy who beat the machines and won the bet is an International Master. The score was 3½-1½. I doubt whether Mr Catt could beat the best programs. Also computers are now very good at fast chess. It seems clear to me that a concerted effort by a good team of 10 to 20 people could produce a Grand Master standard program in three or four years.

The cost in man-years would be a small fraction of the total effort so far on chess-playing programs. It would, of course, be a microscopic fraction of the effort spend so far on playing chess.

C. B. WOOD
Munich.

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondents state that their letters may not be cut.

DECservice,(TM) it doesn't just promise total service commitment. It guarantees it.

DECservice sets a new standard of service. A degree of guaranteed commitment unique in the computer industry. DECservice's features make it the price/performance leader in the market.

Make comparisons. Ask around. See if any other computer company is prepared to guarantee all these vital points in its service agreement.

1. Response. Promising to answer your call as fast as possible is normal. We guarantee to be on-site in four hours maximum. That's different.

2. Continuous effort. We will not stop working until your machine is back in operation. We guarantee it.

3. Action Outage(R). A guarantee of management involvement to ensure effective repair of your system, through an alerting procedure extending to the highest levels of our international network. It guarantees that all our specialised resources are put at your disposal.

4. Computerised history of your system notifying automatically any excessive repair times over a specified period. It guarantees preventive action.

5. Personalised service. An account-responsible engineer will be assigned to your system; our force of more than 2000 engineers in Europe enables us to make this guarantee.

To get comprehensive information about DECservice, use the coupon.

I want to know more about DECservice(R)
Name: ____
Title: ____
Address: ____
Tel.: ____
Send to: Digital Equipment Co. Ltd.
Attn: Field Service Manager
Digital House, 252-256 Kings Road
Reading, RG1 4H4

digital
Digital Equipment Co. Limited

MALCOLM PELTU REPORTS ON THE 'BIRTHDAY' SPEECHES OF ICL's TOP TWO

Dr Wilson prescribes more Euro comms investment

'As much part of home as telephone' Dr Wilson ... 'creation of a world in which the integrated television display with own processor and file storage becomes as much a part of the home as the telephone'

URGING more co-ordinated European action across a wide spectrum of policies relating to information technology, ICL managing director Dr Chris Wilson last week stressed the importance of the development of European communications services with adequate high bandwidth capabilities and the establishment of a secure European source of advanced silicon technology.

The development of the right communications infrastructure is vital, he said, if the advantages of information technology are to be sufficiently exploited in Europe. However, he believes "previous efforts by European PTTs in this area have quite frankly left a great deal to be desired".

He also said, "We must make sure that European sources of technology are available. Total or over-reliance on foreign sources for technology is only a short step from similar reliance on the finished product."

Speaking at a Press briefing to celebrate ICL's tenth anniversary, Dr Wilson concentrated on his vision of how "data processing and informatics" will affect the way society develops.

Central to this vision was the creation of a world "in which the integrated television display with its own processor and file storage becomes as much a part of the home as the telephone."

This type of device, he said, will provide the home of tomorrow with most of its communications with the outside world and highlights the importance to modern industrial society of having the most advanced communications capabilities, in particular the availability of high bandwidth systems, possibly using fibre optics for all telephone/television users.

"Communications is a fundamental need of any society," he said. "This means that the communications revolution must go hand in hand with the processing revolution made possible by silicon technology; and with the equally revolutionary changes in information storage technology currently being developed."

"ICL is in a sound take-off position and can begin thinking and acting far more strategically."

There were many complex implications resulting from the new integrated information services that are being developed.

For society, Dr Wilson said, "most important of all is the establishment of a truly effective body of European law governing those topics which are of legitimate public concern and which have a special relevance to the informatics community and those affected by it.

"What we do not want to face is a mass of unco-ordinated national laws and regulations in this area. They would slow down the general progress of all of us through our legislators failing to understand the realities of the situation."

The areas identified by Dr Wilson for concerted European legal action include privacy and the protection of the individual against infringement of personal liberty, fraud prevention, electronic funds transfer, transnational data flows and copyrights and patent agreements.

An indication of the commercial reality behind the kind of development envisaged by Dr Wilson was highlighted by a recent report from US consultants International Resource Development Inc which predicted that the market for Integrated Video Terminals, of the home-based communications system described by Dr Wilson, would eventually amount to "billions of dollars" (CW, October 12).

And that report suggested that the market for IVTs would be dominated by computers and electronics manufacturers, such as IBM and Texas Instruments, rather than by traditional TV makers.

Dr Wilson did not refer to this report but he is obviously keenly aware that the challenges facing ICL over the next decade are likely to be very different from its first ten years, with the complex and unpredictable impact of information technology creating new market opportunities as well as new competitive challenges.

In the past, he admitted, circumstances had compelled ICL "to take a very day-to-day approach to running our affairs. We have had to pull ourselves up by our bootstraps."

Now, however, he said that ICL was in a "sound take-off position and can begin thinking and acting far more strategically."

Europe is clearly a major aspect of that strategy even though Dr Wilson accepted there were many obstacles to overcome in trying to get Europe to act in an agreed, co-ordinated way.

He stressed his belief in the establishment of a "minimum but necessary preference policy to combat foreign infiltration on an EEC basis," even though current EEC policy is moving towards more open competition in the community.

But Dr Wilson pointed out that, despite an EEC plan to remove preference in computer purchasing in 1981, there was no indication that countries such as Britain and France would be prepared to do so on a national basis.

ICL chairman Tom Hudson said he believed the Tories are closer than is often believed to current government thinking on preference policies.

Dr Wilson's European hopes on telecommunications developments were also tinged with a strong awareness of some of practical problems of getting European authorities to act quickly and in unison.

He criticised previous efforts by European PTTs in providing adequate national communications infrastructures.

"Urgent technical decisions have been taken too late and in a manner which takes too little account of what is going on and being achieved elsewhere in the world," he commented.

In particular, he praised the proposals of the US telecomms giant, AT & T for its Advanced Communications Service (CW, October 26) as being on the right lines.

But he accepted that to support an advanced communications network requires high bandwidth capabilities which must "involve major public investment."

Dr Wilson therefore hoped that the subject would "hit the headlines more often with the social benefits being made very clear."

Addressing an audience of journalists from UK national, local and technical papers, Dr Wilson frequently stressed the role he believes the news media could play in creating a better and more informed understanding of the complex issues posed by information technology.

The information processing industry, he said, would provide increasingly efficient and effective technological capability but he challenged those in the Press, radio and TV to "generate the understanding, the discussion and the general will and desire to benefit from what can be provided for the enrichment of our lives."

While accepting that recent reporting on television on the impact of the micro had created considerable public and political interest and debate, the [illegible] effect of the debate had been to create a "certain amount of alarm and despondency" caused to some extent by the emphasis in the programmes that the micro has made possible the most spectacular advances [illegible] automation overnight and that there are serious doubts [illegible] whether society can absorb the social consequences of such rapid developments.

But, Dr Wilson said, there should be more considered in-depth judgments on these admittedly spectacular technological advances.

Dr Wilson said he believed himself that the alarm about the impact of the micro is understandable but does not [illegible] reality. "I think that automation developments will be slower than expected [illegible] of the numerous peripheral engineering problems that need to be solved."

Eventually he believed the pace of automation developments would accelerate dramatically but "in the meantime we have a breathing space and must make the best use of it."

MIND GAMES

The world's largest range of over 3,000 games and puzzles — a fascinating selection in which skill, aptitude, mathematics and logical deduction all play a part. Role-playing fantasy games. War games of all eras. Abstract games. Books and Magazines

Write for FREE Catalogue to Games Centre (CW10), 18 Hanway Street, London W1 (01-636 8278). Also at 2 Castle Street, Kingston-on-Thames (01-549 8486). Personal shoppers welcome at both branches or order by post from W1 Centre.

'System 4 should have been killed'—

PUTTING a retrospective boot into the amalgamation of ICT and English Electric Computers to form ICL, the ICL chairman Tom Hudson said last week that the merger should never have taken place — and once it did, System 4 should have been killed.

At the time of the merger, in 1968, he had advised the company to drop System 4. There were, he said, obligations to System 4 customers which gave the new company inherited commitments of about £5 million to develop new operating systems for System 4 and that English Electric did not have a strong organisation backing up the range.

In a remarkable speech at ICL's tenth birthday "Press party", Hudson veered from his prepared speech to make his stinging attack on System 4, as well as peppering his remarks with some tart observations on ICL's early traumas and on politicians and former ICL managing director Geoffrey Cross.

But his strong criticisms of System 4 were the most surprising, as the internecine strife in the early years of ICL, with many English Electric staff regarding the operation more as a takeover by ICT than a genuine merger, had largely been forgotten over the last few years when ICL began to emerge more as an entity in itself.

The merger, said Hudson, had cost about £90 million in trying to iron out some of the problems of System 4 and in trying to integrate the organisations and product lines. "If I had been chairman at the time, I would have killed System 4."

Two major System 4 operating system developments in development at the time of the merger were Multijob and a system code named System R which was aborted by ICL before it became publicly available.

Commenting on his speech, some ICL employees said that Hudson failed to point out that many of the people working on System 4 operating systems have played a major part in the design and development of the VME/B operating system for the 2900 series.

Whatever else, the employees pointed out, the merger therefore bequeathed ICL a pool of that rare resource — skilled staff; and, as Fred Lamond recently pointed out (CW, October 19) there is an argument that ICL could have made better use of System 4.

Hudson also said the decision to go ahead with the 2900 could be described as "almost foolhardy" because it was the kind of ambitious project which could so easily escalate.

"But once you get involved in a project like this there is only one way to go — and that is forward," he commented.

However, he added, "the pay-off is becoming evident" for having been an industry leader in designing a new range "from the ground up" and he predicted that other manufacturers, including IBM, will suffer "growing pains" in the future as they try to introduce new ranges.

He also recalled that he had hesitated when he was asked to become company chairman in 1972 because he believed that the company had "deteriorated" since its inception and that it was then in a "precarious state."

Turning to politicians, he commented that people such as Harold Wilson, Tony Benn and Frank Cousins, were all now eager to claim that it was they who had been responsible for establishing ICL, saying that ICL is now a financial success story.

But many of the same politicians, he said, were also eager to disclaim responsibility for unpalatable events, such as Rhodesian oil sanctions busting.

Frequently emphasising his own strong involvement in having brought ICL through some difficult experiences, Hudson surprisingly commented that he wished former managing director Geoff Cross, whom he had been instrumental in bringing to the company in 1972, had left the company a year before he did.

Cross left last year for what he said were primarily personal reasons.

"I decided in 1972 it was necessary to bring in an outsider to help sharpen the company and give it a personality of its own," said Hudson. For four years, he added, the aggressive, possibly abrasive, management style of Cross, with its emphasis on tight financial control was "absolutely desirable and invaluable" to the company's needs at the time.

But after that, he said, it became necessary to replace Cross' managing director, and Cross' successor Dr Chris Wilson, who is primarily a "marketeer" with a good, wide awareness of the strategic needs of the computer industry and experience in product specification.

And he made it clear that, in his opinion, Dr Wilson would be the right man for the next decade.

Hudson also staked his claim for having been a key figure in one of the milestones in ICL's history, the acquisition of Singer's international operations of Business Machines nearly three years ago. He pointed out that he had set the acquisition ball rolling by telephoning the head of Singer, Joe Flavin, when he knew, as soon as he heard it was on the cards [illegible]

LOW COST MOS MEMORY from FABRI-TEK

for PDP-11 series, prices from £650* for 16kw module, immediate delivery

☐ Easily Installed
☐ 1 Year Warranty
☐ Compatible with PDP-11 Series including PDP-11 04, 5, 10, 34, 35, 40, 45, 50, 55.
☐ Contained in single Hex PCB

Other products for PDP-11 include 32 kw, 64 kw MOS Memories, Core Memory and Cache Buffer.

Low prices for 32 kw and 64 kw on application.

*for quantity

50-52 Moorbridge Road, Maidenhead, Berkshire, SL6 8BN, England. Telephone: Maidenhead 37321-4 Telex: 847665

MICRO NEWS

Edited by Martin Banks

Mystery over IBM RAM development

THE introduction of System 38 by IBM, hard on the heels of the 8100, has thrown another spanner in the works of guessing just what the company is doing in the development of high capacity random access memories. To add to the 64K and 18K devices introduced with the 8100, the System 38 is to incorporate 32K devices, together with a new bipolar, LSI logic array chip.

The problem with these devices is that IBM is unwilling as yet to issue any other information than that they exist. This is diametrically opposed to the normal behaviour of the semiconductor industry which tends towards a freedom of information that can, on occasions, even cause later corporate embarrassment.

Industry observers, especially in the US, have however extensively analysed the little information that is available, and have come to the following conclusions.

Firstly, the chip is very large. This is based on perhaps the firmest piece of evidence that exists, a photograph of the chip (right) provided by IBM.

According to one observer, Ben Rosen of stock analysts, Morgan Stanley, in New York, relating the chip shown to the number of skin ridges on the fingers supporting it indicates that the chip is somewhere between 59,000 and 87,000 square mils in area. This is around twice the size claimed by Texas Instruments for its own recently announced 64K part.

The photograph also provides evidence to suggest that, as a major US memory user put it, "IBM's design is primitive".

This is based on the ratio of storage area (the regular pattern down the sides of the chip) to peripheral and logic circuitry. The normal ratio from the semiconductor industry is around 60:40, storage to peripherals. In the IBM part, this ratio seems to be reversed.

Coupling this with the little information provided by IBM as to the manufacturing process of the RAMs points, according to Rosen, to an attempt by IBM to use an obsolete manufacturing process.

The statements from IBM include "n-channel metal gate FET", "silicon nitride", and "conductive field shield". The metal gate and nitride characteristics are features used for some time by IBM in the production of its major RAM product, the 2K part.

These three point strongly towards an old, and now out of favour metal gate process. As an example of its obsolescence, Rosen states that this same approach was taken by Mostek in the development of its own original 4K RAM. This part, the 4096, has since been superseded by a re-engineered part, the 4027, and is ending its final production runs about now.

There is according to Rosen, evidence to suggest that IBM recently went "shopping" to buy a new MOS process, but that no deals were made, and that having proved that it can make devices using the older metal gate process with the 2K part, has opted to force it up in device complexity.

The final clue comes in the "guesstimated" access time of the 64K RAM. As the part is to be used only in the slower 8130 system, rather than the faster 8140, the industry speculation is that the IBM part has an access time of around 975 nanoseconds. This, as Rosen points out, "is a rather pale shadow of the 110 to 150 nanoseconds of merchant market parts".

As a final thought on IBM's position on RAMs, the old process technology, and large chip size should mean, in relation to current semiconductor manufacturing practice, that the parts should be almost non-productible. Rosen points out, however, that IBM's history in semiconductors has repeatedly demonstrated that the company can achieve cost-competitive memory products, despite such disadvantages.

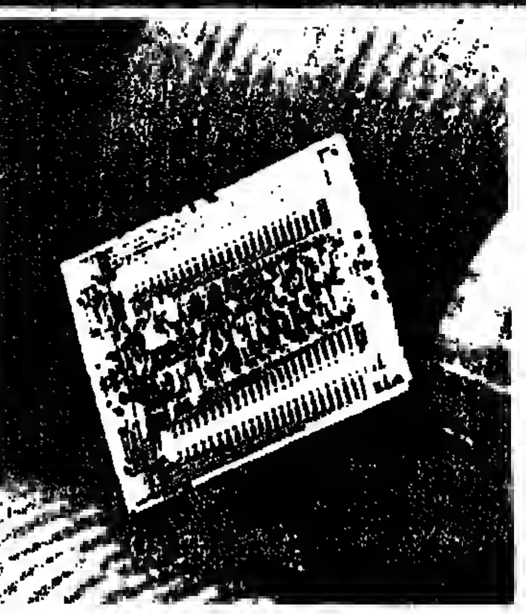
An equally small amount of information is available from the company on the new LSI logic device being used in the System 38 processor.

What is known is that it is a bipolar device that is constructed as 704 TTL circuits on a single chip. This tends to indicate that IBM has selected an array circuit design technique, such as has been used for several years by Ferranti, with its uncommitted logic array devices.

This suggestion is borne out by the IBM statement that the circuit designer specifies the interconnections between the 704 circuits on the chip to meet particular system needs, this data being used for subsequent mask making.

It is further borne out by a comparison with Ferranti's latest ULA range, the 5000 Series. Ferranti's device, at 484, has a lower "circuit" count, but it does have to cope with a wider variety of applications requiring a greater number of different circuits. It also has 48 interface circuits, of which no mention is made by IBM.

The nominal speed quoted by IBM is between 3 and 5 nanoseconds, compared to a typical 6 nanoseconds from Ferranti. Chip size for IBM is around 33,000 square mils, while the Ferranti part is a little larger, at 35,000 square mils.



The RAM guessing game . . . IBM only provides this photograph as a clue to what it is doing in the development of high capacity random access memories.

Complete look at semiconductors

THE complete works of the semiconductor industry in the production of integrated circuits, is how the IC Master reference book could be described, covering as it does virtually every common type of circuit available.

Unlike other reference books on the micro, the IC Master has the advantage of providing a potential single source for information on all the components needed for the development of microcomputer hardware, rather than just the microprocessors themselves. The importance of this lies in the fact that for every microprocessor used, there is a vast number of memory and peripheral circuits required.

Divided into broad product categories, the book then uses a major specification criterion as the key to finding specific products to suit a given requirement. For example, in memories, the main key is the basic type — ROM, PROM, RAM, etc, followed by device organisation — 1,024 × 1, 4,096 × 1, etc.

The cost of IC Master, which is published by UTP of New York, will be £49.50 for the 1979 edition. A prepublication price of £39.50 is being offered until January 31, 1979. It is available from Watts-Steadman and Partners, Saffron Walden, Essex.

Bleasdale courses to cover T1 16-bit chips

EXTENDING his horizons in microprocessors is Eddie Bleasdale, managing director Bleasdale Computer Systems. Up to now a strongly Motorola-oriented operation, his company is now extending its range of courses to cover the Texas Instruments TMS9900, 16-bit device.

Two courses will initially be provided, covering the fundamentals of the device, and designing systems using the part. The former, a one week course, will cost £235 and the latter, running for two weeks, will cost £470.

So far, each course has been scheduled for six runs during 1979, complementing Bleasdale's existing schedule of courses on the Motorola 6800 microprocessor.

More details can be obtained from the company at 7 Church Path, Merton Park, London, SW19.

Single board for $279

THE price of personal computer hardware continues to fall, for the US company, Ohio Scientific, has introduced a single board system that includes an 8K Basic in ROM, and an integral "qwerty" keyboard for $279.

Known as Superboard II, the other major features of the board include an MOS Technology 6502 microprocessor, 8K bytes of static RAM, a video display interface and a Kansas City audio cassette interface.

Its one obvious disadvantage is that it is being sold without a power supply. However, the company states that any +5 volt DC, 3 amp supply will power it. For the non-handyman, the company is also packaging the board, with power supply, in a case. This is being called the Challenger 1P, and has a price tag of $349. For both versions, the company points out that export prices are slightly higher.

The video display capability provides upper and lower case characters, graphics and gaming characters for an effective screen resolution of up to 256 ×256 points. On a TV display, this can provide up to 30 × 30 characters.

Available options include an expander board that features 24K bytes of static RAM, a dual mini-floppy interface port adapter and the company's own 48 line expansion interface. A complete software library is also available. Deliveries are scheduled to start in December.

Datasolve

IBM370 and 303X users...

Here's your through-ticket to MVS

MVS is tomorrow's direction. That's the IBM line.

It's great to arrive but it can be a fearsome journey if you travel alone. We should know. We were first in Europe.

Since Datasolve came to MVS four years ago we've been the navigators for dozens of other companies who wanted to travel the same route.

Helping them gain MVS experience on our large IBM and Amdahl computers before letting them strike off on their own.

Allowing them to build up MVS momentum to a point where their own operation could take over.

Giving them expert technical assistance, comprehensive MVS training and the benefit of our special MVS services like TSO3, the interactive program development aid to conversion.

Datasolve will help you plan and administer your MVS itinerary with the understanding, experience and cost-effectiveness that only Britain's most seasoned MVS travellers can provide.

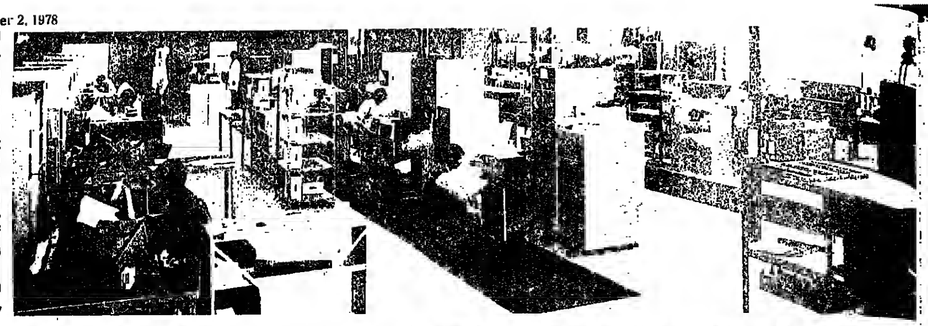
Whatever your route to MVS, Datasolve is just the ticket.

BOC Datasolve

BOC Datasolve Limited
Datasolve House
99 Staines Road West
Sunbury-on-Thames
Middlesex
Telephone: Sunbury 85566

Maintenence ie eomething we all tend to teke for granted: it ie eomething which juet happane, lika the weathar. Occaeionally the eervice provided ie excellent, most oftenitis just adaquate, and usars grumbla about it but eccapt it. The fact that eny company might actually carry out a continuoue and intensiva axemination of its maintenanca operation, conatantly etriving to increase customar satisfaction even if only by a percentage point or two, is almoat inconceivable.

But computer companias do teka maintanance extremely sariously, aven if few can boast maintenance fanatics quite as single-minded and enthusiaetic as Pier-Carlo Falotti, head of maintenanca for DEC in Europa. Tim Palmer reports from Geneva.



● This is the interior of DEC's European repair centre for faulty modules brought bech from customer sites by service engineers. The centre, at Hoofddorp, Holland, brings all returned modules up to the latest specification, after which they are returned to regional service centre stores to be used again as required.

Tim Palmer talks to DEC's European customer services boss Pier-Carlo Falotti

Promising is one thing—deliver is something else

"PROMISING is one thing — delivering is something else." That is the uncompromising dictum over the desk of Pier-Carlo Falotti, European manager of Digital Equipment's customer services organisation in Geneva.

Falotti is passionately dedicated to improving service to DEC's customers throughout Europe and the evidence suggests that this vital, but much neglected, aspect of the computer business is really getting better for DEC users.

"You reported in Computer Weekly a few months ago that IBM users were satisfied with IBM customer engineering, and quoted a satisfaction figure of seven out of 10.

"I was a little concerned at the report (CW, May 4), because our customer satisfaction rating — over a much larger sample than IBM's — averages 7.4 out of 10 in some countries and, at worst, is 7.1."

DEC has been conducting customer satisfaction surveys on its maintenance operation for four years throughout Europe, and for six years in some countries.

"We have consistently asked the 10 same questions, and four years ago, the rating varied between 5.8 and 8.2, so there has been a consistent improvement. The questionnaire is sent out to all our customers, and we get a 48 to 50% response, which represents about 5,000 replies.

"We do a computer analysis of the replies and classify them by product and by type of customer. We are getting a particularly high rating from our 'critical' customers, those with applications for which downtime is materially damaging.

"Such customers have a superior maintenance contract which guarantees a better response time and 24 hours a day service compared with the standard contract."

That sounds encouraging, but Falotti is never satisfied with anything less than perfection.

"The rating should be the same regardless of the type of maintenance contract, because those with the standard contract have lower expectations.

"I will never be satisfied with anything less than 10 out of 10, but I know we can never achieve that: customers tend to be exigent when they fill in questionnaires.

"On the other hand they tend to mark people-related questions higher than impersonal ones, because they don't like to say nasty things about the guy who comes to visit them."

This can be seen from a detailed breakdown of the figures. Customers are asked to circle digits from zero to 10 against each question, and are told that zero means unacceptable, five means average and 10 means outstanding.

The highest rating, 8.5 from those with critical contracts, 8.3 from those with standard, is given for "attitude of engineer"; next highest is competence of engineer, rated 7.5 for both types of contract.

At the other end of the scale, lowest mark, 8.5, is given for preventative maintenance on standard contracts, and this also rates low at 6.8 with critical contracts. The lowest rating in the latter category is for repair time, which is rated 6.6 out of 10. Availability of spares is also rated low at 6.8 by both sets of customers, and looks like an area where it would be comparatively straightforward to improve the rating next time.

The other categories, each of which is rated 7 or better by both sets of customers, are overall quality, which gets 7.2 on standard and 7.4 on critical contracts; response time; overall reliability; and field service management.

Falotti is convinced that far from being a fringe activity, quality of maintenance can make the difference between winning and losing business.

"Maintenance is a predominant cost, and so serviceability of a product is also crucial. Good preventative maintenance can improve the reliability of a system, but you have to weigh up the costs of too much downtime with the costs of too much preventative maintenance, and the crossover point of the two curves is different for each model.

"People are of course what a good maintenance service depends upon.

"People are our biggest problem and our biggest challenge, and our rate of growth makes it worse.

"We can still find trained people in the UK, which is why we have a service organisation there which is more than twice the size of those of all other minicomputer manufacturers put together — including IBM's Series 1.

"In France we recruit from a national training school for people wanting to go into electronics, and in Germany from the Control Data Institute. We then teach them general computer science, trouble-shooting and English.

"We recruit between one in 10 and one in 20 of the candidates we interview, and each is interviewed by at least two people. As a result, only IBM has a lower turnover of staff.

"In Italy we advertise, and offer a grant during training. We average 300 replies and 12 recruits per advertisement.

"We have specialised training schools, one for CPUs, another for mass storage devices and a third for systems.

"The students start with a spell in the office to get the feel of things, then do a month in class, covering basic appreciation and basic trouble-shooting.

"Over the next three months they are allocated according to aptitude, and spend half of each day doing a self-paced instruction course. So they do not have to spend three of four months sitting in class."

DEC's service business is organised as a world-wide profit centre. "That way, we have the resources we need for investment where it is needed, and ensures that we get our priorities right.

"Traditionally maintenance has been a hardware specialisation, but at the higher end of our line, maintenance engineers have a system rather than a hardware orientation. The emphasis has switched from the software to nearer 50% — after all, if customers use DECnet, we have to have engineers who understand DECnet.

"This provides a clear career path, because there are new specialisations which used not to exist.

"We have a world-wide engineering review board which assesses the capabilities of the individual, and people move to become systems and application engineers designing systems like networking systems, comparatively few become managers.

"We do find a difference between different countries; people from the Mediterranean area tend to want to end up as the boss, whereas Americans do not care so long as the money is good. But passing to a higher level via the review board offers a means of giving individuals enhanced status."

With a significant number of multinational customers like Chemical Bank, DEC maintenance engineers are often travelling from country to country, which raises some major problems.

"We have an international network of spare parts which is maintained according to the rate of consumption, and we used to transfer the data on stock levels and so forth by means of magnetic tape. But it is getting harder and harder to transfer data across borders so we are going to have to find another way to do it." Similar problems arise when engineers try to take parts through customs.

"As long as parts can be found, we will go on maintaining old machines. We have even opened a factory in Salem, Massachusetts, which specialises in making parts for obsolete products, including things which we used to buy in from companies which have since gone out of business.

"In Europe, we also have a central module repair facility in Holland.

"Each module sent there is updated to the latest revision, goes through the full test sequence, at the end of which we get a success rate of 98 to 99%. The module is then sealed at the factory, and not unpacked until it is withdrawn from stock and taken to the customer site.

A new service contract, designated DECservice, is being introduced, which will include remote diagnostics on the newest systems, like the VAX-11/780, later the PDP-11/70, will interface to enhance further the service to the customer (CW, October 5).

Falotti ... I will never be satisfied with anything less then 10 out of 10, but I know we can never achieve that: customers tend to be exigent when they fill in questionnaires.

GNT 3406 Tape Punch

● AUTO LOAD
● 0-70 CH/SEC
● 5-8 CH
● Both Free Standing and Rack Mounted

LOW PRICE

GNT Automatic (UK) Ltd.,
Windsor House,
1 Albert Street, Slough,
Telephone: Slough 21296/7

Facit 4030

Punched tape reader family-120 ch/s

FACIT DATA PRODUCTS

Maidstone Road Rochester, Kent. Telephone: Medway (0634) 401721

This is the third in e short aeries about the BCS Specialist Groups. John Race, a senior lecturer in computer science at Brunel University, outlines the activities of the Microprocesaor Specialist Group, which will be taking part in the BCS 79 Living with Computers conference and exhibition in London from January 4 to 6.

BCS group assesses the impact of the micro

MICRO-ELECTRONICS and microprocessors are, arguably, the biggest things in computers since the transistor. Their effects on hardware and software are already profound, and may extend out of our own profession to change the jobs and lives of everybody.

The Microprocessor Specialist Group was inaugurated in November 1978, with the aim of exchanging information on hardware and software developments and applications in programmable micro-electronics; promoting the use of relevant software methodologies and techniques; and assisting members in dealing with suppliers and distributors of micro-electronics.

We try to achieve these by holding meetings, about five times a year, at which an authoritative speaker reports on his company's or institution's activities and plans in the field.

John Race

Our policy has been not to try to devise or impose standards in this field, or to take sides in the debate on whether microprocessors are a curse or a boon to the computer professional, the manager, and the man in the street; nor have we yet published anything. Instead, we try to educate ourselves by listening and talking.

Non-members of the BCS are welcome to our meetings — everyone pays 50p at the door. It should be noted that membership or affiliate status is, however, worth having: for example, the cost of attendance at BCS 79 is reduced by more than the cost of becoming an affiliate.

At BCS 79 the Microprocessor Group will exhibit various working devices and there will be discussion on the impact of micro-electronics, led by Derek Roberts, managing director of Plessey Micro Systems; Alex d'Agapeyeff, chairman of CAP; and Keith Chapple, managing director of Intel UK.

It is expected to cover such topics as: should the UK concentrate on using micros, making them or developing software for them?

You are invited to join our meetings and information can be had from the BCS (01-637 0471).

When considering the impact of microprocessors there seems to be three possible areas of discussion: The impact of micros on life in general, on the UK economic scene, and on the professional.

In dealing with the first, a vigorous but emotional debate has begun on the impact of micros on the quality of life. We are fairly sure they will be as influential as steam, cheap electric motors, and transistors.

We can say, too, that the computer professional has perhaps more responsibility than most, and should act as a watchdog, giving warning when his devices look like turning antisocial.

This topic is splendid for debating, but at present involves more speculation than calculation!

In respect of the UK economic scene, the issue seems to be, what priorities should be given to manufacturing micro-electronic components; developing software and systems using foreign components; using foreign software systems and components in our products and processes?

Arguments for the first are Increased employment, decreased reliance on foreign imports, hence a better balance of payments and less chance of political blackmail, and a chance of commercial success. The arguments against are that we are late in the field, and that our market is smaller than that open to the US manufacturers.

The arguments in favour of the second point are that our costs are low and our skills are high in putting together packages for other countries to use.

Since hardware costs continue to fall, the proportion of value added to the package by software and innovation tends to rise. The argument against is that sooner or later we put ourselves out of business.

The argument for using foreign components is simply that we have got to improve our productivity and quality to remain competitive. The argument against this is simply that trying to remain competitive implies fewer jobs, which is unacceptable to the unions.

It is the impact of micro-electronics on the design engineer, the production controller, the accountant, and the DP manager or analyst that perhaps concerns the Microprocessor Group most directly. It seems very likely that micros are going to change their jobs radically. This has arisen because Grosch's famous law ("You can get four times the CPU power for twice the money") is no longer important. Everyone can have a calculator for petty cash, a computer for a few thousand.

Will this lead to bad programming, unsafe systems, and loss of central control as databases fly out of head office and roost in regional offices or even individual clerks' desks?

Can the DP manager survive the loss of his big mainframe, and have even more influence on his company by providing a training, ideas, and software service for other people's hardware?

Our group is active in providing a platform for the exchange of information on techniques for professionals of all kinds who believe they need to know about micros.

We think that we should not try to cover all the enormous issues raised, but concentrate on what they mean to the professional.

A new line of calculators with plug-in function modules has been introduced by Monroe International, a division of Litton Industries. Called the Monroe 2850 series, there are six models, ranging in capabilities from a simple printing version up to the 100-step programmable/printing machine which also has 48 registers that: retain data in memory even when disconnected from the mains power supply. Nine different function modules are available, allowing the user to build up his own personal library of capabilities. The picture shows the Monroe 2850 with its easily changeable function modules.

Now Fairchild sues DG

THE long-running litigation between Data General and Fairchild has taken a new twist, with the news that in the San Francisco Federal Court, Fairchild is counter-suing Data General, alleging an attempt to prevent competition.

This follows a suit from Data General against Fairchild (CW, May 12, 1977) which has alleged misappropriation of trade secrets and violation of software licence agreements between the two companies.

Earlier this year (CW, May 4) Fairchild replied to the Data General charges, and asked the Delaware Chancary Court to dismiss the case.

The subject of the suit and counter suit is Fairchild's 9440 16-bit microprocessor, which can emulate the Data General 1200 computer. Data General allege this is a violation of trade secrets. Fairchild, in its counter-suit, allege that DG's suit is: "...an attempt to impede a natural and highly useful course of technological development and advancement."

Fairchild has under development a new micro, the 9446, which, it is suggested, will emulate Data General's Nova 3.

Package for architects

A SMALL hardware and software package aimed at architects, engineers and surveyors has been introduced by the Royal Institute of British Architects with a view to easing the design task involved in assessing energy efficiency in buildings.

The package is based on a Texas Instruments TI 59 calculator, coupled with a PC100B print cradle. The software is a suite of nine programs written by the RIBA Energy Group. The first of these will calculate thermal efficiency in buildings.

The energy group, Pat O'Sullivan from UWIST, architect Richard Burton and RIBA energy consultant Will Pascall are committed to expanding the range of programs available as part of the package, and are looking at such areas as acoustics and daylight factors.

COMPUTEL GIVES 1900 USERS AN EVEN BETTER DEAL WITH THE NEW ORANGE 1900

Here's great news for all 1900 users.

Computel, who have always prided themselves on offering their clients the best and the latest, now have an orange 1900.

It consists of an ICL 2960 running under the Direct Machine Environment operating system.

The advantages to both existing and new clients are impressive.

It extends the life of existing 1900 software.

It offers greater throughput, faster tape system, larger discs, greater reliability and resilience.

It has twice the on-line filestore capability.

If you have a large program you will particularly benefit from the increased main store and speed of throughput.

With all the existing advantages offered by Computel we think you'll agree 1900 users never had a better opportunity.

Why not find out more by sending off the coupon or ringing our Sales office.

Where we build on experience to set the pace.

For the attention of Tony Matthews. CW 2/11
Please tell me more about the benefits of using the Computel Orange 1900service.
Name
Address
Position
Company Tel No.

computel

To: Computel Limited, Eastern Rd., Bracknell, Berkshire RG12 2UP
Tel: 0344 26767

Details of additions to ICL 7500s

A TERMINAL programming language called TPL that meets requirements for data validation, error correction ond local file look-up is a notable feature of the 7501 Model 15, one of two models added by ICL to its 7500 family of intelligent terminal systams.

The other new model is the 7500 Model 10, which can have up to 40K bytes of memory, up to two video terminala and two printers. Softwara for data validation and screen formatting can be loaded from a remote host. The basic 7501 Model 10 with a 20K memory and one screen costs lass than £4,000.

The bigger 7501 Model 15 has similar hardware to the Model 10 but with the addition of two dual floppy disc unita, each with s capacity of half a million bytes. The floppy diac storage enables the Model 15 to be used in atandalone mode, running programs written in TPL.

The 7501 Models 10 and 15 are both compatibla with the more powerful exiating 7502 terminal systems from ICL.

Sanction clouds over S. Africa

MANY South Africsn computer supply companles are implementing measures designed to counter the threat of embargoes which may be imposed if the country fsils to modify its internsl policies to meet criteria laid down by the United Nations, writas Esmond Frank from Johanneaburg.

Although most local computer houses are keeping their snti-embargo plans under tight wraps, the Pratoria-based company, Perseus Computing and Automation, which distributes Data General Nova and Eclipse hardware in South Africa, acknowledges that it has doubled the value of its stocks of components to stave off the effects of nny possible sanctions.

Perseus mannging director Doug Eyre said that the threat of a US embsrgo on computer suppliers, which would inescupahly embrace European sources, could not be discounted.

"To support the existing installed buse of 450 Nuvas nnd Eclipses, by far the largest general-purpose small computer populntion in South Africa, we have doubled our component inventory value to more than R500,000 (sbout £295,000), giving us an estimoted two-year repair cnpacity."

Eyre added that Perseus has the capability of internally effecting more than 99% of all component-level equipment repairs.

But he pointed out that major benefits are still to be derived from access to the economies of production scale as well as to the fruits of the research and development investments of leading foreign computer manufncturers.

"It is to be huped that political fuctors will not further jeopardise continued supplies from these sources. Howaver, there is little doubt that South Africans should be marshalling their resources now to reduce the dependence of our computer industry on imports."

While he believes that it would be prudent "like the Boy Scouts to be prepared," he said it did not make economic sense to actually produce indigenously while cost-effective imported products continued to be available.

Plessey radar helps monitor rainfall in North West

COMPUTER control will enable this weather radar system to operata completely unattandad when it is set up on Hemeldon Hill in Lancashira to measure rainfall for the North West Water Authority and the Met Office.

Plessey makes the radar equipment, called Type 45C, and the control is provided by a Digital Equipment PDP-11/34. The radar is reflacted by rainstorms and the strength of the reflections anables the amount of rainfall over an area of roughly 100 miles radius to be calculated, replacing around 600 mechanical rain gauges. (A few of these mechanical rain gauges are retained for calibration.)

A two-way microwave link will connect the unmanned site to the water authority's centre at Franklaw, where a dual PDP-11/34 will process the data, mainly for the purposes of flood warning in the initial stages. Later developments will enable the information to be used in water resource allocation as well as weather forecasting.

Other communications links will send the radar data to centres in Warrington, and the Royal Radar Establishment, Malvern.

Message switch from Arbat

A MESSAGE switching system has been introduced by Arbat of London, called Intelex. It can manage a database of 999 telex addresses with up to 99 names each, control 9 message priority levels and drive 48 telex lines and 48 terminals at the same time. Based on a PDP-11, it was developed using Arbat's Aims-II operating system and programming language.

It optimises connection and transmission activity by scanning its message queues for more than one message going to the same address.

Wave of enthusiasm grips software houses over IBM's minis

IN the heydsy of the pop music boom in the mid-1960s people would rush out to buy the latest Beatles or Rolling Stones single on the day of release.

A similar wave of enthusiasm now grips software houses specialising in IBM's small business systems whenever a new model is imminent.

Thus it wos thot Rona Bassett, software projects director at Osprey Computer Services of Romsey found herself in the IBM regional sales office in Bristol on Tuesday afternoon last week, hovering impatiently over the telex machine as details of the new System 38 chattered through. "The first big surprise wsa the price," she told Computer Weekly.

"We have one System 34 at present, and with 64K-bytes, 13 Megabytes on disc, three screens and a 300 lpm printer it rents for about £1,200 a month. Doubling the memory and disc, adding two more screens and a matrix printer will bring it up to about £1,700, and we are planning to install a second one in the larger configuration shortly. We were planning on a 128K byte model of the new machine with 100 Megabytes on disc and six screens, and we expected to have to pay about £3,000 a month.

"In fact, the 512K byte System 38 with 129 Megabytes on disc, 650 lpm printer, six screens, diskette magazine and 120 cps printer will still only come to about £2,000 a month; we are taking all the software which will add another £300."

Osprey's first System 34 was installed in June. "We had intended to keep our System 32 for a few months, but the 34 is so much more powerful that we have sent the 32 back," said Rona Bassett.

"The other big surprise was the whole relational database that you get with System 38. It means that you will have to design your system right but the approach that it demands is the one we use already in the systems we design."

Osprey specialises in IBM GSD machines, and has written systems for 23 System 32 and five System 34 users. It has already received a contract to design a System 38 application for a US customer.

HAVING 3350 TYPE DISK DELIVERY PROBLEMS?

STORAGE TECHNOLOGY CORPORATION
the world's largest independent manufacturer of 3350 drives and 3830 controllers
CAN DELIVER NOW

Storage Technology Corporation
has over 3000 spindles installed and is currently producing over 600 spindles per month

Call the Sales Manager now for a quotation

STORAGE TECHNOLOGY LIMITED
10-12 Old Court Place
Kensington, London W8 4BR
Tel: 01-937 9638
STL Tlx: 918076

MICROSYSTEMS'79
MICROSYSTEMS'79
MICROSYSTEMS'79

2nd Annual Conference and Exhibition, on Microelectronics and Microprocessor-based Systems 31 January – 2 February, 1979, West Centre Hotel, London

Microsystems '79 will be a vital forum for managers and designers, providing information on the latest developments and application techniques in this fast expanding technology.

A day on personal computing will extend the conference's scope to the exciting world of do-it-yourself systems.

Scope
New devices, programmable interfaces
Development systems
Software development aids
High level languages
Costing microprocessor software
New skills, old organizations
Software skills
Design team structure: software/hardware balance
Maintaining and testing microsystems
Implementation case studies

Personal Computing
Users' experiences
Buying and building microsystems
Applications
Techniques
Software needs and availability

Please complete and return to:
The Conference Organizer, Microsystems 79,
IPC House, 32 High Street, Guildford,
Surrey GU1 3EW, England.
Telephone: (0483) 71661

☐ Please send me details of the conference programme, when finalised.
☐ I would like to submit a paper for Microsystems 79. Title ....

☐ My company is interested in participating as an exhibitor.
Name ....
Position ....
Organisation and address ....
Telephone No. ....
Organized by Iliffe Promotions ... publications Computer Weekly, ... Processing, Electronics Weekly, ... Electronic ... World.

RELATIONAL DATABASES

By Max Stewart Part 2

THIS week we will look in more detail into the meaning of relationships between data items.

Item relationships: The term data item has its usual meaning: it corresponds to a field in a conventional file. A data item value is a particular value of a field. If changing the value of a data item has an effect upon the value of another data item, the two items are said to be related. Otherwise they are unrelated.

If two data items are related, there is a further measure of just how they are related:

1-to-1 relationships: If any one value of data item A can correspond to only one value of data item B and vice versa, the relationship between A and B is called 1-to-1.

1	to	1
Customer Number	:	Customer Name

where each customer has a unique customer number and no two customers have the same name.

1-to-n and n-to-1 relationships: If any one value of data item A can correspond to more than one value of data item B, but each value of data item B can only correspond to one value of data item A, the relationship between A and B is called 1-to-n and the relationship between B and A n-to-1.

1 to n			n to 1		
Salesman	:	Customer	Customer	:	Salesman

n-to-n relationships: If any one value of data item A can correspond to more than one value of data item B, and any one value of data item B can correspond to more than one value of data item A, the relationship between A and B (and between B and A) is called n-to-n.

n	to	n
item	:	order number

where each item can be ordered by several customers (and can thus be ordered under a variety of order numbers) and where each order (and hence order-number) can be for several items. In the example, Figure 1, Part 1, Spuman ordered kegs and taps in the order with an order number of 2. Bungs were ordered by Crudgington (order 4) and Fiddle (order 5).

Dependency and keys. If the relationship between data items A and B is n-to-1 or 1-to-1, a particular value of A corresponds to one and one only value of B. A value of A thus uniquely defines a value of B. A is said to be a key for B, and B is said to depend upon A. In the special case of a 1-to-1 relationship, B is also a key for A, and A also depends upon B.

Example: If the conventional file in Figure 1 were to be updated by an incoming transaction, the value of ITEM in the transaction record would be sufficient to select a single record in the file for update. DESCRIPTION or QTY-IN-STOCK could be immediately updated. The value of ITEM is insufficient, however, to update any fields in the repeating group (ORDER-NO, CUSTOMER, SALESMAN, QTY). Since, within any one ITEM record, the value of ORDER-NO is sufficient to identify any one member of the repeating group, the combination of ITEM value and ORDER-NO, value uniquely identifies a customer, a salesman and a quantity. The relationships can be summarised as follows:

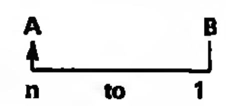
n	to	1
ITEM		DESCRIPTION
ITEM		QTY-IN-STOCK
ITEM, ORDER-NO		CUSTOMER
ITEM, ORDER-NO		SALESMAN
ITEM, ORDER NO		QTY

The combination of ITEM and ORDER-NO is thus a key for QTY, for example, and QTY depends upon the combined values of ITEM and ORDER-NO. Note that although ITEM, ORDER-NO is a key for CUSTOMER, having ITEM as part of the key is unnecessary since ORDER-NO alone is sufficient to define a CUSTOMER.

n	to	n
ITEM		ORDER NO

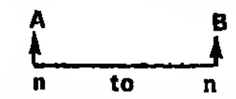
Any particular value of ITEM cannot be relied upon to select a unique value of ORDER-NO, or vice-versa. ITEM is thus not a key for ORDER-NO nor vice-versa.

Relationship diagrams. The relationships between the data items in Figure 1 can be expressed in the form of a relationship diagram. If the line joining two data items has an arrow at one end and not the other, the relationship between the arrowed end and the non-arrowed end is n-to-1. Example:

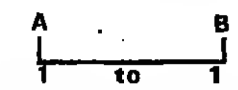


The relationship between A and B is n-to-1 and the relationship between B and A is 1-to-n.

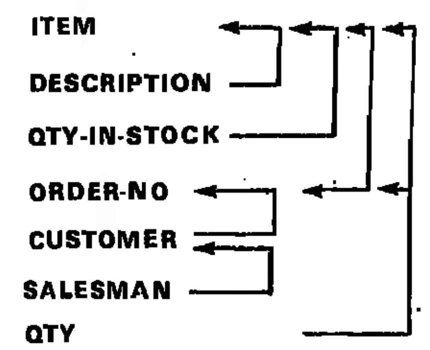
If the line joining two data items has an arrow at each end, the relationship between the two data items is n-to-n. Example:



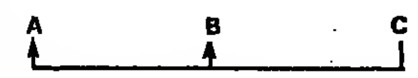
If the line joining two data items has no arrows, the relationship between the two data items is 1-to-1. Example:



The relationships between the data items in Figure 1 can be expressed in a relationship diagram as follows:



The notation



means that C depends upon a combination (concatenation) of A and B, and that the relationship between A and B is n-to-n. This notation is a special contraction of a more general notation which will be discussed later in this series.

In the diagram above, ITEM and ORDER-NO together form a concatenated key which uniquely identifies a particular value of QTY. This is significant: a key does not need to be a single data item, and the definitions "key" and "dependency" apply equally to concatenations of data items.

Summary: We have seen how the idea of a key and the notion of dependency are natural consequences of particular types of relationship between data items, and how relationships can be expressed in the form of a relationship diagram. Part 3 will demonstrate how a set of relational files can be constructed from a relationship diagram.

£250 million can't be wrong!

LEASING IS BIG BUSINESS.
IT'S GROWN FROM £5 MILLION IN '76 TO £250 MILLION IN '78.
£500 MILLION IS PROJECTED FOR '79!

FIND OUT NOW WHY LEASING CAN OFFER YOU BETTER BUSINESS CARS AT LOWER COST!!

MOTOLEASE
THE NAMED SPECIALISTS IN VEHICLE LEASING

marketplace

LYME
The New British manufacturer of low cost (£645 one of End User) high quality high specification VDU Terminals
TEL: 01-452 0490

Contact Steve Bass

For Advertising Rates PHONE 01-261 8757

LYME for details 01-452 0490

Fungus is mushrooming everywhere
Genuine Dec items and compatibles available, immediate ex-stock deliveries, enormous savings. Installation and maintenance contracts arranged on all products. Why not let us quote you?
fungus COMPUTER PRODUCTS LIMITED
16 ALBION STREET, CASTLEFORD, W.YORKS.WF10 1EW
TELEPHONE:(STD 0977) 550111/550577 TELEX:557644

41,000 sq.ft. OFFICES TO LET
A HERON CORPORATION DEVELOPMENT
Bournemouth
HERON
* Air Conditioning.
* Anti-solar Glazing.
* 2 x 10 Person High-Speed Lifts.
* 63 Car Parking Spaces.
* Fully Carpeted.
* Prestige Entrance.
* 100 lbs per sq. ft. Floor Loading.
For full details contact:
Hartnell/Taylor/Cook The Mall, Clifton, BRISTOL BS8 4DR Tel: 0272 39061
Hawksby Harding 37-43 St Peter's Road, BOURNEMOUTH BH1 2JR Tel: 0202 23491

1401 WANTED
Full or part systems considered, including 1401/1406 2 x 1402, 2 x 1403, 1 x 1407, 1 x 1311 (Mod 4), 4 x 13 x 11 (Mod 2), 8 x 729. Plus ALL test equipment, spares, etc.
Offers to LEATHERHEAD 78951

reprints
If you are interested in a particular article/special Feature or advertisement published in this issue of
COMPUTER WEEKLY
why not take advantage of our reprint service.
Reprints can be secured at reasonable cost to your own specifications providing an attractive and valuable addition to your promotional material. *(Minimum order 250)*
For further details contact:
Brian Bannister, IPC Electrical-Electronic Press Ltd. Phone: 01-261 8046 or simply complete and return the form below.
To: Brian Bannister, Reprints Department Dorset House, Stamford Street, London, SE1 9LU
I am interested in .... copies of the article/advertisement headed .... featured in COMPUTER WEEKLY on page(s) .... in the issue dated ....
Please send me full details of your reprint service by return of post.
Name ....
Company ....
Address .... Tel. No. ....

SOFTWARE FOR DEC
Intec complete accounts RSTS/E and Dibol Data Base/2 the RSTS/E database system plus report writer plus data entry system (DES) Fast backup, letter writer, critical path.
TSX Multi-user for any RT-11 system. Dibol simultaneous program development and production.
RTSORT 20 times faster than DEC's.
Oasis Sully, Turnkey Software Limited, Sycamore Rise, Chalfont St. Giles, Bucks 02407-3410. Telex 24224.

OPERATORS CONTRACT AND PERMANENT
FOR A PROMPT SERVICE
PHONE 01-439 6481 NOW
(24 HOUR ANSWERING SERVICE)
EFFECTIA GRAVIS

EFFECTIA GRAVIS

Offers are invited for the purchase of
18 SHUGHART 901 FLEXIBLE DISC DRIVES
(Hard sector, single sided)
Most are in good working order but no warranty will be given. May be sold singly or as a job lot.
Tel: John Bell Dorking 87777

GIVE US YOUR RUBBISH
If you donate your computer waste to us you will be making a valuable contribution to helping us care for over 5,000 children in need of love, care and security. Help bring happiness into their lives.
Please contact
Paul Harrison
National Children's Home
85 Highbury Park
London, N5 1UD
01-226 2033

FINANCE YOUR CHRISTMAS PARTY
Sell your scrap Computer Printout and Punch Cards
To Leyton Waste Paper Co.
Contact Mike Bowles 01-558 2131
START NOW

DEC DEC DEC DEC DEC
PDP11/04 and 11/34 Systems and Peripherals for immediate delivery
Also various Refurbished PDP8 and 11 Systems, and Modules from stock.
★★ SEPTEMBER OFFER ★★
PDP-8I 8K Fully Refurbished, £1,200.
S.K. SYSTEMS LTD.
Stevenage Road, Hitchin, Herts.
Tel: (0462) 35257
Telex: 826715 S.K. SYS.

"GIVE US THE ...
[illegible]
If you give us ... your computer waste we can do the job of caring for over 5,000 children who need love care and security.
CAN YOU HELP?
Please contact
Paul Harrison
National Children's Home
85 Highbury Park
London, N5 1UD
01-226 2033
... we'll do the job."

AVAILABLE NOW
1403 N01
with additional controller
1442 Reads/punch
2501 B02
BOX 1993

Advertiser offers proposition to someone who has developed 8-bit byte micro, using BASIC, with expansion boards, keyboard VDU, floppy diskette and teletype.
BOX 1989

LOOK AT THE CROWD IN OUR MARKET PLACE
Our Market Place feature (today on page 18 – 19) enables you to reach a vast 82,000 circulation of whom no less than 91% personally request their copies. No wonder we attract more display advertising than any other computer journal. 35% of all computer ads appear in our pages – and Market Place is the most cost-effective of all for leasing, 2nd hand hardware, maintenance services, wholesale goods and contract staff ... The rates are:
3.35 s.c.c. £9.35
38-98 s.c.c. £7.70
99 s.c.c. and over £6.05
Series discounts: 7 – 5%, 13 – 10%, 26 – 15%, 52 – 20%
COMPUTER WEEKLY

FOR SALE
IBM Systems 3 Model 10
comprising of
32K BSCA 10 MB disc storage
300 LPM Printer MFCU Model
A01 plus 2 times 5496 data recorder
12 times 5454 disc cartridge
Apply Box No. 1992

FOR SALE
5444 Disc ...
Telephone ...

ELECTRONIC BROKERS LTD
PRINTERS & TERMINALS
CENTRONICS MATRIX PRINTER MODEL 101A
165 characters per second. 132 print positions
Adjustable paper width 4 to 14⅞
Vertical Format Control 9 & 7 dot matrix
Parallel Interface 64 ASCII character set
£950
TELETYPE MODEL 33 INPUT/OUTPUT TERMINALS
KSR33 .... £425.00
ASR33 .... £650.00
ASR with Acoustic Cover £675.00
DD390 KSR £525.00
DD390 ASR £795.00
Teletype Pedestal £30.00
HAZELTINE VISUAL DISPLAY UNITS
SUPER SAVINGS ON MASSIVE BULK PURCHASE
★ Teletype Compatible
★ 12" Diagonal Screen
★ TTY Format Keyboard
★ 64 ASCII Character Set
★ 5 x 7 Dot Matrix
★ Switch-selectable Transmission Speeds up to 9600 baud
★ Switch-selectable Parity
★ Standard CCITT V.24 Interface
"Glass Teletype" Model H.1000 ONLY £350
Buffered/Editing Model H-2000A 28 lines of 74 characters, with direct etc. ONLY £495
WE SELL WE BUY
MINI COMPUTER EXCHANGE
BIG SAVINGS ON OUR LARGE STOCKS OF DEC PROCESSORS, PERIPHERALS, ADD-ON MEMORY, OPTION MODULES AND RACK CABINETS.
PDP 11/04 Processors with MOS or CORE Memory in 8K and 16K Increments. AS NEW CONDITION — FROM £2,500
OTHER CPUs CURRENTLY IN STOCK
PDP 11/05 .... FROM £2,250.00
PDP11/20 .... FROM £1,200.00
PDP11/40 .... FROM £7,500.00
ADD-ON MEMORY
MM11F 4K core stack with backplane (11/15 11/20) £300.00
MM11L 8K core stack (11/05 11/10) £1,000.00
MM11DP 16K core stack (11/04 11/34) £1,700.00
MM11UP 16K parity core stack (11/35 11/40) £1,250.00
MF11UP 16K parity core stack with backplane (11/35 11/40) £1,500.00
MS11FP 8K MOS (11/04 11/34) £650.00
MS11JP 16K MOS (11/04 11/34) £1,200.00
PDP8 SERIES
Large stock of CPUs — PDP8E, PDP8M, PDP8I, PDP8L
PLUS ADD-ON MEMORY AND WIDE RANGE OF OPTION MODULES
ALL AT GREATLY REDUCED PRICES!!
NEW CATALOGUE NOW AVAILABLE
Send for new 80-page Catalogue containing latest information on our stocks of Test Equipment, Minicomputers, Computer Peripherals, Stroboscopes and Tachometers
Apply on official company headed paper for your free copy (Private address applications please remit £1 Airmail to overseas addresses £2)
All items quoted are refurbished second-user equipment unless otherwise stated. Our trading conditions can be supplied on request
ELECTRONIC BROKERS LIMITED
49-53 Pancras Road, London NW1 2QB
Tel: 01-837 7781 Telex 298694

DATA SERVICES HAVERING LTD.
80 column card and magnetic tape, 1600 B.D.I.
Main office 01-593 8474
Mag. tape Hornchurch 56218
80 col. card requirements Rayleigh 770898
Hockley 5587
Large volume work our speciality. Daily workloads welcomed. Collection and delivery service. Competitive prices.

CUT DEVELOPMENT COSTS ON YOUR RSX-11 SYSTEM
Let us — quote you a Fixed Price for your Software Development.
— tell you more of our range of off-the-shelf products.
SYADON LTD., BIRCHWOOD HOUSE, HEATH RIDE WOKINGHAM, BERKS. RG11 3QJ
Telephone Eversley (0734) 734493

WEBSTER D/P SERVICES LTD.
FOR USED DP EQUIPMENT BUY OR SELL THROUGH WDP
NEW DE LUXE 80 COLUMN HAND PUNCHES (EX-STOCK)
01-464 9011
WEBSTER D/P SERVICES LTD. 85 WIDMORE ROAD, BROMLEY KENT BR1 3AA

KEY OPERATIONS ASSISTANCE LTD
CONTRACT
★ OPERATORS ★
★ PROGRAMMERS ★
★ PUNCH OPERATORS ★
LEADING SUPPLIERS OF CONTRACT OPERATIONS PERSONNEL THROUGHOUT EUROPE
SAVE TIME AND MONEY CALL US FIRST
LONDON 01-493 5736/8
MANCHESTER 061-833 9343
EUR/OPS
4 HALF MOON STREET, LONDON W1Y 7RA

COMPUTERS BOUGHT AND SOLD
E O B EQUIPMENT LTD.
Tel. 0783-293818
Telex 637763

IBM 370/155 J00 available shortly
IBM 370/145 J00 available November
IBM 370/145 available immediately.
IBM 370/135 100 and J00 available December.
IBM 370/125 GF2 available immediately.
IBM 3340 Data Modules available immediately
For further details please call Geoff Henderson on 061-439 8931 or Linda Kane on 01-488 7807.

Nelson Computer Services Ltd.
URGENTLY REQUIRE
Univac VIP'S and VP'S
Tel: 07062 29125
St. Johns Court
Bacup Road, Rawenstall
Lancs.

CoOperators supply first-rate contract operations staff for long or short term needs — FAST
RING NOW 01-836 8411

OLIVETTI TE 318
For sale. High quality on-line terminal with integral paper tape reader and punch. Usual keyboard plus additional integral cluster of numeric keys for high speed punching. Immaculate, low hours condition having spent entire life beside professional man's desk for urgent, low volume work. New price now near £2,000. Offers.
031-226 7382

RUBIDE
Take away Tallys from 1600
Contact either BRUCE CANE or JAMES WICKES on 01-658 5906.

Contract Operator, Data Prep. Programmer/Analyst Staff
Knight 01-491 4706
Staff Services Division of BOC Datasolve Group and as a member of Computing Services Association.
Knight Computer Services Limited, 14 Old Park Lane, London W1.

2000
Upgrading? Downgrading? New Systems? Program Maint.?
Holidays? Peak Work Loads? Weekend Overtime? Sickness?
01-637 3265
Systems — Programming — Operations
When you need Contract people, Computer Two Thousand will make your life easier.

FOCUS computer services limited
CONTRACT or PERMANENT—
ANALYSTS · PROGRAMMERS · OPERATORS
PUNCH OPERATORS · DATA CONTROLLERS
Tel. 01-487 5781 28A Devonshire Street · London · W1

HEXAGON computer services
01-439 3671
145 WARDOUR STREET, LONDON W1V 3TB
Contract & Permanent recruitment
Total DP Support at its best
Programming, Operating
Data Preparation, Systems
Data Control, Technical Support

New light on transmission of information

By Morris Edwards

Ever since the development of electrical communication methods, work has gone on to improve the quality and the capacity of the transmission medium. The use of light to carry information has been experimented with since the days of Alexander Graham Bell, but until the advent of the laser and the optical fibre this technique had not been practical. Now, communications systems based on fibre optics are becoming a reality and in this article Morris Edwards discusses some of the latest developments.

THERE is nothing new about the idea of using light to carry vast amounts of information. In the nineteenth century, Alexander Graham Bell was keenly interested in the basic concept of optical communications, and he experimented with what he called a "photophone", a system for carrying messages by means of sunlight reflected from mirrors.

However, two research breakthroughs were needed before optical communications could become practical. The first was the discovery of a suitable light source. Light from the sun or lamps cannot provide the concentrated narrow band of frequencies necessary for communications applications.

The answer came in 1960 with the first demonstration of the laser, a device which gives off a concentrated beam of light at a single frequency.

The second major breakthrough was the discovery of how to make a suitable optical transmission medium. Transmission of light beams through the atmosphere is severely limited by fog, smog, rain and snow.

However, specially made glass fibres can trap light waves and carry them for several miles with little loss in signal intensity.

Today's fibres are so transparent that light loses more intensity passing through an ordinary window pane than it does in 500 feet of fibre. Put another way, if seawater were as transparent, one could easily see to the bottom of the deepest ocean.

In terms of system components, optical links are no different from any other communications setup. You still have a transmitter, a transmission medium and a receiver.

The transmitting source may be either a solid-state laser or a high-radiance light-emitting diode; the receiver uses a photodetector, which is generally a silicon avalanche photo-diode.

What makes optical transmission so radically different is the fact that it substitutes a stream of photons for a stream of electrons. This means that the optical circuit is totally isolated electrically, so it is immune to electromagnetic interference, does not generate inductive crosstalk and is not susceptible to the crosstalk of neighbouring copper circuits.

There is no need for extensive earthing loops or bulky cable shielding, and short circuits are harmless, even in an explosive atmosphere.

Further, since signals do not radiate from fibre cables, they resist intrusion. A simple, well-designed cable would have to be broken into for an intruder to gain access to the information. Also, the very weak dependence of optical loss on frequency and temperature simplifies the design of receiver electronics since no equalisation is required.

Optical fibres have the advantage of being thinner and lighter than copper wire, yet they have the tensile strength of steel. They also have a far larger information transfer capacity than copper wires.

A single fibre has already carried more than 30,000 telephone messages over a distance of six miles in a demonstration and the theoretical capacity of the fibre is on the order of 1,000 Mbps.

There is another good reason for switching from copper wire to optical fibre in view of the growing strategic importance of copper as a scarce raw material.

Despite these benefits of optical fibres, none of them warrants the effort required to develop fibre optic technology, in the view of Dr R. D. Maurer of Corning Glass Works, Corning, New York. To him, cost has always been the dominant motivating factor.

Fibre costs have dropped dramatically to about $1.25 per metre, but this figure is still high because of the laboratory environment in which fibres are made.

Assuming a normal operating plant production environment, Dr Maurer believes that present technology can reduce the cost to 10 to 20 cents per metre for annual production volume in the range of 10,000 to 100,000 kilometres.

Dr Maurer states that optical fibres could have been used years ago but the repeater spacing would have been too short for economic systems because the existing fibre attenuation was too high.

Today, he says, attenuation is no longer regarded as a major problem area and receives little research attention.

Instead, the focus has shifted to other practical problems, such as increasing the information capacity, and developing techniques that allow fibres to be made long and strong and to be drawn rapidly while still maintaining dimensional precision.

Fibre attenuation has been dropping steadily since November, 1070 when Corning reported two 30 metre sections of fibre optic waveguides with a total attenuation of 20 dB/km. Subsequently, Corning reduced fibre losses to 8 dB/km, and in May, 1973, Bell Labs scientists announced glass fibres with losses as low as 5 dB/km. At this level, attenuation in the fibre accounts for 50% of light loss over a distance of 2,000 feet; this meant that repeaters in a fibre optic system could be placed further apart than repeaters in the land cable systems then in service.

Corning later reduced attenuation to 4 dB/km and in May, 1974, Bell Labs reported losses as low as 1.2 dB/km at the infra red wavelength of 1.06 micrometres, or microns. Now, Corning can produce kilometre lengths of such fibres. The lowest attenuations reported have been about 0.5 dB/km.

To obtain such high transparency, optical fibres are designed so that the light never comes near the outside surface of the fibre, where dust, scratches or contact with other surfaces would cause serious losses.

Each fibre comprises three layers. The outer layer is a coating, usually of plastic, that provides protection from scratches and abrasion which could weaken the fibre and lead to breakage under stress.

Within the protective coating, the glass fibre itself has a core region with an index of refraction slightly higher than that of its surrounding cladding.

Because of this higher refractive index, rays that enter the end of the fibre at a shallow angle to the central axis are reflected back into the core when they strike the interface between the core and the cladding.

Rays that enter the fibre at large angles to the axis escape without being reflected. Provided there are no sharp bends in the fibre, rays reflected back into the core at the first encounter with the interface will continue to be reflected along the length of the fibre.

Light rays that enter parallel to the central axis of the fibre will normally travel a shorter distance than those entering at an angle which carom from side to side as they travel down the fibre. As a result, a light pulse made up of a combination of rays becomes spread out over time.

This phenomenon, known as modal dispersion, limits the pulse rate, and thus the information capacity of the optical communications system. The dispersion can be greatly minimised, but not entirely eliminated, by grading or shaping the refractive index of the core to compensate for the different distances that the rays travel.

In such fibres, the refractive index decreases with radial distance away from the centre. Since light travels faster in regions of lower refractive index, it is possible to adjust the variation in refractive index so that all rays arrive at their destination at close to the same time.

Writing in the August, 1977, issue of Scientific American, W. A. Boyle, executive director of Bell Labs' research and communications sciences division reports that these "graded index" fibres have reduced modal dispersion by a factor of 25 compared with "step-index" fibres in field tests.

Optical fibres also suffer from chromatic dispersion, which arises as a result of the slight differences in the refractive index of the glass for different optical wavelengths.

All sources of light contain a finite packet of optical wavelengths, and since the refractive index differs slightly for each wavelength, their propagation velocities are different, so the pulse spreads out while passing down the fibre.

For sources with a large wavelength spread, such as light-emitting diodes, chromatic dispersion can limit system bandwidths and/or length. With solid-state lasers, which have a very narrow spectral spread, chromatic dispersion is negligible.

According to Dave King and Otto Szentesi of Bell Northern Research, modal dispersion in step-index fibres limits the maximum bandwidths to about 35 MHz-km. Writing in the February, 1977, issue of their firm's technical journal, Telesis, King and Szentesi report that graded-index fibres may have bandwidths greater than 500 MHz-km, and they consider such fibres to be the leading candidates for communications applications.

One way to prevent modal dispersion is to limit the core size and core-cladding index differences so that only one mode is allowed to propagate along the fibre. Such single-mode fibres have been fabricated with bandwidths as high as 2 GHz-km, but their small core size creates difficulties in obtaining low attenuation.

The small diameter, about two to four microns, also greatly complicates aiming a light beam into the fibre and makes alignment and splicing of fibres extremely difficult.

Sources for optical communications systems may either be LEDs or lasers, both of which are comparable in size to the optic fibre, which makes for easier coupling. Both are also capable of being modulated at very high rates. Many modulation and coding techniques may be used, but the binary on off modulation of the light source is the most practical. Analogue information, such as voice or video, must first be digitally encoded; it may then be transmitted, along with data, as a stream of light pulses through the fibre to the receiver, where the photo-diode reconstitutes the original electrical signal.

The wavelength of the light source greatly impacts the transmission performance. Light losses in fibres arise from two distinct effects. One is absorption of light by impurities embedded in the fibre material. These losses can be reduced, but it is difficult to eliminate them completely.

Another source of loss is scattering of light inside the fibre (Rayleigh scattering). This loss decreases continuously as the wavelength increases and reaches a minimum at wavelengths between about 1 and 1.2 microns.

Dispersion also reaches minimum values at wavelengths in the vicinity of 1.2 microns, so to keep both attenuation and dispersion as low as possible, the wavelength should be in this range.

LEDs made from gallium arsenide, GaAs, which emit at a wavelength of about 0.8 microns, are satisfactory. However, Bell Labs' Boyle reports that semiconductor materials are under investigation which promise a better wavelength match for optical fibres.

Until recently, the only practical semiconductor laser for optical systems was the gallium arsenide laser, which emits at wavelengths between 0.8 and 0.9 microns.

Research on new semiconductor materials at Bell Labs however, has shown that adding antimony to gallium arsenide is an effective way to "tune" the laser. By increasing the amount of antimony in gallium arsenide antimonide, the light emission can be continuously tuned to any wavelength from 0.9 to 1.2 microns.

Already, such lasers have operated for as long as 21 hours, which is encouraging because GaAs lasers, which now have a life expectancy of over ten years, lasted only a few minutes in their earlier laboratory versions.

In a report entitled "Fibre optic communications," International Resource Development of New Canaan, Connecticut, compares light sources. According to the report, since LEDs propagate many modes, they are best suited for multimode fibres.

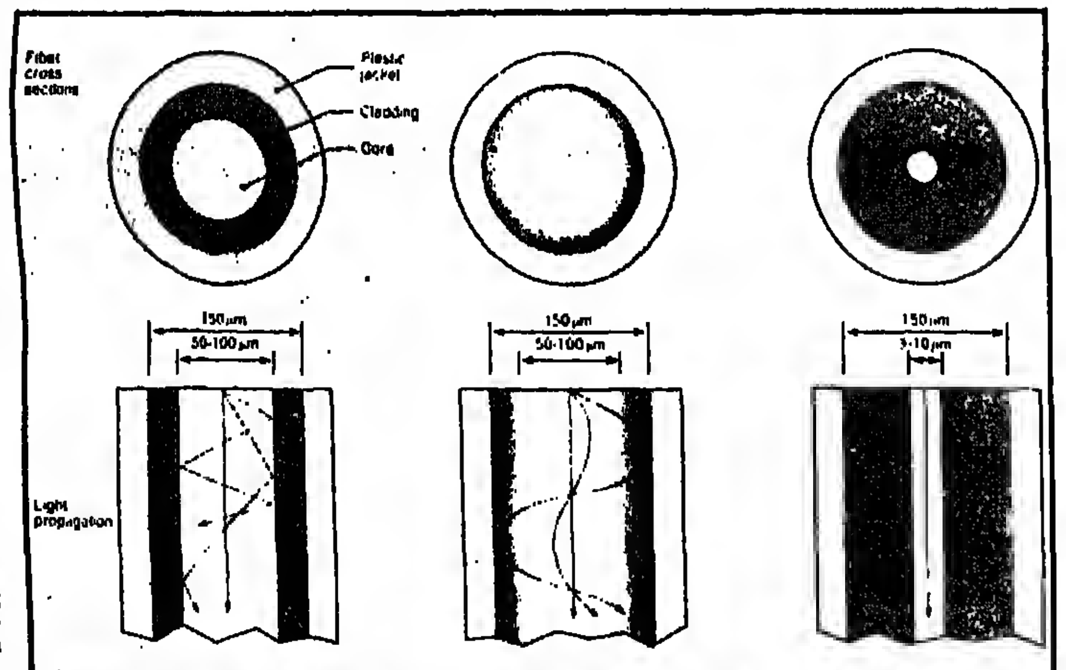
However, LEDs spread their light over a wider angle than lasers, so less output power can be coupled into the fibre. The output of LEDs, however, is more linear than lasers, and LEDs can be operated continuously with little or no effect on their lifetime.

Lasers can be operated continuously too, but the cost is presently high and the lifetime generally limited to 4,000 hours at best with commercial lasers. Nearly all of the commercial LEDs used for fibre optic communications systems are based on the Burrus diode developed at Bell Labs by C. A. Burrus in 1971.

Lasers have two main advantages as light sources. Because the light emerges from the laser in a narrow beam, it is possible to couple a large fraction of its radiation directly into the end of an optical fibre. Secondly, the small spread in colour of the laser light minimises chromatic dispersion.

In the receiver, photo-detectors capture the photons emitted by the laser or LED source and convert them to electrons. There are two types of photo-detectors found in present-day optical communications systems: PIN silicon photo-diodes, and silicon avalanche photo-diodes. High performance PIN silicon photo-diodes have been commercially available for many years and, since they respond at wavelengths between [illegible] and 1.15 microns, they match the laser and LED sources used in optical systems. PINs exhibit nanosecond response times and are well-suited for systems operating at rates less than [illegible] MHz using TTL circuitry, and [illegible] 50 MHz using ECL [illegible].

Silicon avalanche photo-diodes have the fastest [illegible] time, the best signal-to-noise ratio, the highest [illegible] efficiency and the highest [illegible]. Their problem is one of temperature sensitivity and the [illegible] bias voltages needed [illegible] high current [illegible].



Optical fibres comprise three layers: an outer coating to protect the glass fibre itself, which in turn has a core region with an index of refraction slightly higher than that of its surrounding cladding. In step-index fibres (left), the refractive index changes abruptly at the core-cladding interface. Because light rays travel different path lengths in the fibre, the pulse spreads out — a phenomenon called modal dispersion. In graded-index fibres (centre), the refractive index of the core decreases parabolically towards the core-cladding interface. All rays now have virtually the same velocity along the fibre, so modal dispersion is greatly reduced. In single-mode fibres (right), the core size and core-cladding index differences are small, and only one mode is allowed to propagate, eliminating modal dispersion, but complicating manufacture, alignment and splicing.

Source: Telesis, published by Bell-Northern Research Ltd. Ottawa, Canada

In 1977 Shell's heating and agricultural division placed itself in the vanguard of developments in the group by deciding to introduce distributed processing techniques to its authorised distributor network. Following a detailed investigation in-house and a comprehensive study done in conjunction with the distributors, this decision has now been implemented in 18 out of an eventual 30-35 locations and has already met all its promised cost justification. This is the background to the distributed processing case study by Ruth Stein.

Oiling wheels of a distributed net

By Ruth Stein

Using an ADDS Consul 520 video terminal supplied by Terminal Display Systems, Yvonne Gloor of Pilot Oils, Nottingham handles customer accounts and administration on the network. This is one of 300 terminals which are being installed by Shell throughout the UK.

THE heating and agricultural division handles all Shell's UK oil sales to the domestic central heating, agriculture, small industrial and commercial sectors of the market. This is channelled through approximately 45 authorised distributors, all substantial businesses in their own right, who cover specific franchise areas. A typical distributor, for example, handles 10,000 customers, employs 50 people and turns over approximately £5 million per annum. The division's association with this network is close, providing a number of service and support activities.

Computerisation was first introduced in 1978 when the division's routine data processing needs were handled by a leading bureau. This was designed as a single entry sales ledger system to control customers' accounts.

It required input data to be recorded on a batch basis and sent by post to the bureau where it was read optically and processed. Speedier than manual operations, it suffered from the inherent inflexibilities of batch processing.

In 1075 a look at Shell Canada's newly installed minis acted as the catalyst for a full-scale reappraisal of the division's computing techniques. The bureau was anxious to enhance the batch system in order to eliminate sequential processes and some distributors were pressing for more sophisticated handling, in particular those companies with large customer lists.

The decision to implement a fully integrated real time minicomputer-based system was made after all other alternatives had been rejected. The major factors which led to this were the desire of the authorised distributors for their own systems, the favourable economics of distributed processing within Shell's own marketing structure and the marketing advantage such a system could provide in the increasingly competitive market.

The objectives of the system definition were to produce a workable system controlled by the authorised distributors at each location and generating as little paper as possible.

Routine operations were to include order capture and invoicing, the central heating boiler maintenance service, customer accounting, customer master records, purchase ledger, automatic credit control and comprehensive retrieval facilities.

It was decided at the outset that interlinked systems were unnecessary, but that an online link with Shell's own computer centre could eventually be desirable.

The division did not have any pioneering instinct and mandatory criteria for the eventual choice of hardware were: known capability or implementation on the part of the contractor, the use of proven hardware and operating software and guaranteed maintenance and support.

The company was specific about its requirements: "A multi-functional interactive real time computer system is one where all information necessary to process transactions is stored within the computer and is available for interrogation at all times to be used selectively and randomly to process all transactions required to conduct business.

"All functions of the system can be performed simultaneously through a number of VDUs with information being produced visually and/or in printed form. Response by the computer to any action initiated through a keyboard linked to a VDU must be less than five seconds in all circumstances and must average no more than two to three seconds."

When the choice of supplier was made, it alighted on a company which had already implemented a minicomputer-based system in a fuels distribution company and written special applications software. Computer Design Systems of Manchester proposed a DEC-based system operating under Mumps, and a typical installation is now centred on a 96K-byte PDP 11/34 with 10 Megabytes mass storage, eight to nine VDUs and four to five printers.

Two pilot exercises, at Pilot Oils of Nottingham and Fuel Services (Garstang), were in operation during the winter of 1976/77. A 100% DEC solution was soon found to be too expensive, although Shell would have preferred a single manufacturer, and experiments were made using different peripherals and terminals.

The choice of VDUs for the project was one of the most significant. There would ultimately be approximately 300 VDUs within the network, a factor which made selection particularly price sensitive, and these would most immediately represent the total system to the users. This meant a simple, rugged device without any complex capabilities.

The success during the pilot installation of the ADDS Consul 520 from Terminal Display Systems was sufficient to ensure it a recommendation from CDS and the distributors involved in using it.

One great advantage of the ADDS terminal was its acceptability to users. It appeared to need little maintenance and its dark-on-light screen was comfortable for people to operate. Its UK supplier was a specialist in VDUs and was local to CDS.

The benefits highlighted by the pilot scheme results were the ability of the companies concerned to take a more positive view of their customers and the strength which accrued to Shell in planning its marketing policies.

While certain changes were made in detail the approach has remained the same in the system which the heating and agricultural division is now mid-way in installing.

The division's users now acknowledge the workability of the system. The sites involved have visual display units and printers (Centronix 701). The distributor's staff input orders and produce priced delivery tickets. All customer accounts are accurately updated daily. Automatic credit control prevents inadvertent deliveries to bad credit customers and engineers' calls are scheduled to make optimum use of their time.

One application which is essentially complex, and had previously been handled manually with varying degrees of success, is boiler maintenance, charging and administration. This involved a 3,000 spare-part file and the new system now handles all charges for parts, engineers' calls, insurance and stock control. It is eventually hoped to institute completely automatic re-ordering of spare parts.

An extension to order capture is the ability to calculate how much heating a customer uses so that a tank refill can be scheduled without the customer needing to order. Future applications will include the prediction of supply and demand among non-heating customers.

Shell has found that users at Authorised distributors have had little difficulty in adapting to the system. Key personnel are trained one month in advance of the arrival of the system, usually four people per site, through an intensive one-week course, and the division's own staff provides systems management skills.

A divisional implementation team also ensures that targets are met, supervises the data take-on period, and ensures on-the-job training.

"Computer Weekly", "Data Processing" and "Systems International" present

COMPEC'78

Britain's major peripherals and systems exhibition

Olympia, London, December 5, 6 and 7

10 am to 6 pm (closing at 4.30 pm on the last day)

Now in its eighth year, Compec is bigger than ever in its new venue and includes a wide choice of computer peripherals, small business systems and mini and microcomputers. Here are some of the 200 exhibitors:-

Adler Business Systems
Allen Computer Services
Ansdox
Anderson Jacobson
Aspen Electronics
Basic Timesharing Inc.
Baydel
Benson Electronics
Borer Electronics
British Olivetti
Bunzl Data Systems
Byte Shop
Computer Automation
C. ITOH
CAP Microsoft
Camronics Data Computer
Cherry Electrical Products
Cole Electronics
Comart
Commodore Systems
Computer Aided Systems
Computer Applications Research
Computer Instrumentation
Computer Marketing
Computer Mart
Computer Technology
Computer World Trade
Computer & Systems Engineering
Computrade
Continental Peripherals
C.P. Clare Electronics
CPU Computers
Cramer Components
Crow of Reading
Daceward
Dacoll Group
Datas
Data Design Techniques
Data General
Data Graphix
Data Logic
Dataplus
Data Precision Equip.
Dataproducts
Data Recording Instrument Co.
Datasaab
Data-Type Terminals
Delta Data Systems
Department of Industry
Diablo Systems
Digico
Digi-Data
Digital Equipment
Drillick Lamenna Corp.
Elbit Data Systems
Electronic Brokers
Euro Electronic Instruments
Eurocom Data
Euroco Business Systems
Fabritek Computer Components
Facit-Addo
Farnell International
Ferranti
Fungus
Gamma Association
GEC Computers
GEC Telecommunications
Goest Minicomputer Systems
General Automation
Geveke Electronic & Automation UK
GNT Automatic
Hamilton Rentals
Harland Data Systems
Harris Systems
Hazeltine
Hewlett Packard
Honeywell Information
Hyperon Computers
IDA
Imlea International
International Systems & Applications
Interest Computer Systems
I.S.G. Data Sales
ITT Consumer Products
Jacquard Systems
Jermyn-Mogul Systems
Kenrick & Jefferson
Keytrainer
K & N Electronics
Leigh Data Systems
Lison
Logabax
L.P. Enterprises
Lyme Peripherals
Lynwood Scientific Dev.
Memorex UK
Micro Consultants
Micro Focus
Mini Computer Systems
Modata
Modular Computer Services Inc.
Mostek UK
Nashua Computer Products
National Computing Centre
Nicolet Instruments
Penny & Giles Data Recorders
Pericom Data Systems
Perkin-Elmer Data Systems
Personal Computers
Pertec International
Philips Industries
Plessey
Post Office Telecommunications
Potter Instrument Co.
Prentice Hall
Prime Computer (UK)
Pronto Electronic Systems
Quest Automation
R & H Applied Dynamics
Racal-Milgo
Richard Norton
Rubide
SEL Computers
SEN Electronics
Set Electronics
Shannon
Sintrom Electronics
Smith & McLaurin
Software Architects
Storage Technology
Sybex Europe
3M UK
Tann Synchronome
Telly
Techex
Tektronix
Telecomputing
Telefile Computer Products
Texas Instruments
Transdata
Transtel Communications
Trivector Systems
Ultrasonic Data Systems
USCL Microsystems
Versatec Electronics
Wang Electronics
Wespac
Wilcox Computers
Willis Computer Supplies
X-Data
Zygal Dynamics

Registration at the door costs £2, but free advance registration tickets will be sent if you return the application below to reach us not later than November 22

COMPEC'78

December 5, 6 & 7 National Hall, OLYMPIA, LONDON

Please send me ...... free pre-registration tickets for Compec '78, which will save me having to pay £2 at the door.

Name ......

Address ......

To Compec Tickets, Room 821, Dorset House, Stamford Street, London, SE1 9LU, England.

CW

Bonding a chip to a lead frame using gold wire and a thermo[illegible] bond machine at Indosil.

Why advanced technology has been quarantined from the rest of India

AT a time when the Greater London Council is considering the establishment of a Free Trade Zone on derelict dockland along the Thames, the operation of one such zone is of particular interest. TIM PALMER reports from Bombay on SEEPZ, the Santa Cruz Electronics Export Processing Zone.

THE Free Trade Zone is a third world innovation designed to boost exports and to quarantine the rest of the country from any unwanted advanced technology.

India has a Free Trade Zone for electronics in the shape of SEEPZ, the Santa Cruz Electronics Export Processing Zone. Complete with facilities like banks and restaurants, SEEPZ is a collection of new factory buildings in a large compound wherein companies can acquire space at favourable rents and make full use of the abundant pool of cheap and competent labour in the Bombay area.

Everything manufactured or processed at SEEPZ is intended for export, and to this end, customs formalities are made very easy. Parts or work are airfreighted in to nearby Santa Cruz international airport, and delivered direct to SEEPZ, where they undergo customs clearance within the compound.

Theoretically this provides for a very fast turnround, and makes it worthwhile for companies to consider setting up, say, a data preparation centre in SEEPZ and fly work in weekly from the US or Europe.

The most celebrated name at SEEPZ, Tata Burroughs, has not actually arrived yet, and when it does begin manufacturing operations has perversely decided to take space not in one of the factory units but in a large warehouse.

There is considerable confusion about exactly when Burroughs will begin manufacture at SEEPZ; some say that printer sub-assemblies for the B80 small business computer will begin to be manufactured later this year; others say that neither dates nor products have been finalised.

Nevertheless the intention is certainly to manufacture peripherals and sub-assemblies for Burroughs low-end B80-B800-B1800 line, and the hope is that ultimately complete B80 systems will be built in India.

The company has an authorised capital of $5 million, $2.5 million of which is at present paid up, held equally by Burroughs and Tata (CW, September 16, 1976); as well as manufacture and assembly, the company will set up a software development centre where machines will be imported, used for development and re-exported, within SEEPZ. Tata Burroughs will also take over marketing, [illegible] in India from Tata Consultancy Services, [illegible] of the US semiconductor manufacturer Intersil who wants to reduce its stake in the company, which is also part-owned by Eurosil with 19%, and the Indian founder who has 9%.

The principal work at Indosil is packaging semiconductor chips and stringing core memories. Wafers are flown in, scribed and diced at Indosil, soldered into the chip carriers, packaged and re-exported.

Memory cores are also strung and assembled into stacks for a number of customers, among [illegible] United Technical Electronics of [illegible].

Indosil has a turnover of $300,000 last year, all of which was accounted for in labour costs, which are about one third of those in countries like Singapore, Hong Kong and Taiwan, the traditional centres of offshore assembly.

Computer Automation, the US low-cost OEM minimaker, is building visual display units at SEEPZ, and has found favour with the Indian government as a result. CA Alpha LSI-2 board minicomputers are being used in the National Informatics Centre, which will provide a major information service to the major ministries of the government.

Another labour-intensive activity [illegible] at SEEPZ is connected with oil exploration. [illegible] thousands of geological tests involving measuring the shock waves from blasts in order to plot the subterranean rock strata were made 20, 30 and 40 years ago, at a time when technology was inadequate to interpret them fully.

Such exploratory tests are now so expensive that companies are going back to the original tracings and reprocessing them using newly-acquired computer-based analysis techniques.

However, multiple shock wave plots are superimposed on a single strip of paper and each shock wave has to be traced individually before it can be processed. The laborious job of tracing the individual lines is being done at SEEPZ with the results being freighted back to the US.

UN to help fund big government database

ONE of the most ambitious computer projects under way in the Third World is India's planned National Informatics Centre, NIC. The idea of the NIC is to establish an enormous database for use by most of the ministries of the Indian government in New Delhi, and the plan is to build a hierarchical star network around a big mainframe (CW, September 16, 1976). The machine has yet to be chosen, but all the major mainframe manufacturers, including ICL, Amdahl, IBM, Burroughs and Univac, are bidding for the business (CW, June [illegible]).

The mainframe is due to be selected shortly for installation next year, and the United Nations Development Programme, UNDP, is putting up $4.5 million for the project, including [illegible] million for the mainframe.

The plan is ultimately to establish distributed databases in various ministries but, as an interim step, all the databases will be built up on the large computer, which will be accessed by micro-computer terminals.

The terminal computers are being made locally and about a dozen have been built so far around Computer Automation LSI-2 microcomputers; some [illegible] terminal computers will ultimately be required, and it is planned to base these on three different types of mini.

Work has already begun on the database, using the Hewlett-Packard Image DBMS on an HP-21MX minicomputer which is expected to be used later as a front-end to the mainframe.

Databases are being established for 12 government departments. The Agriculture Department is establishing a database of information covering surface and ground water, rainfall and meteorology, the better to be able to plan for and limit the impact of India's periodic droughts.

The Finance Ministry is establishing a database of budgetary information, including foreign exchange, statistics. In the [illegible] industry and technology an [illegible] patent information system and systems handling licensing, manufacture, imports and production of electronic goods are being established.

Overseas collaboration

ANY organisation with a computer in India that sells time and offers services to outside users, believes itself to be fully competent to collaborate on overseas projects.

As far as hardware goes, Bombay Surburban Electric Supply, BSES, the city's power company, is better placed than most, with three IBM 1401s. The machines churn over for a combined total of 1,100 hours a month, over half the time being devoted to work for outside customers.

BSES is in the market for a new 512K byte machine to replace the 1401s this year, and ICL is hoping to get the business with a 2950.

BSES claims 50 computer professionals with experience in Autocoder, Cobol and Fortran, has done conversions and markets software packages, and seeks to collaborate abroad on the development of application and system software.

Systech International of Bombay is a small company specialising in the use of computer-aided design and systems analysis for the chemical and petrochemical industry. It employs 35 people including 10 consultants, represents specialist software company SDRC of Cincinnati in India, and claims competence in linear and mixed integer programming.

The Central Machine Tool Institute in Bangalore wants to co-operate with foreign companies on the development of Computer-Aided Design structural analysis packages both for use in India and for export. The Institute was funded by Czechoslovakia from 1961 to 1966, and now gets funding of $1 million from the United Nations Development Program.

India EDP Centre of Delhi wants to quadruple its number of employees to 80, and plans to get its first in-house machine, an Interdata 7/32 32-bit mini later this year. It is developing a key-to-floppy disc system, and adapting a Linotype typesetting machine to take input from floppy discs.

Ost Data of Delhi specialises in engineering applications, employs 15 professionals and says that it is collaborating on projects in France and West Germany. It is also putting together data conversion systems for in-house use.

Isvaran Consultancy Services of Madras has five professional staff and is doing software development for a microcomputer built around the Z80 chip. The machine is being built by Processor Systems India of Bangalore, and includes video terminals, two Megabyte floppy disc backing, console typewriter, printer and tape cassette drive.

Isvaran has written a compact Cobol compiler for use on a 16K byte system which includes all the features of the Ansi standard apart from sort-merge facilities.

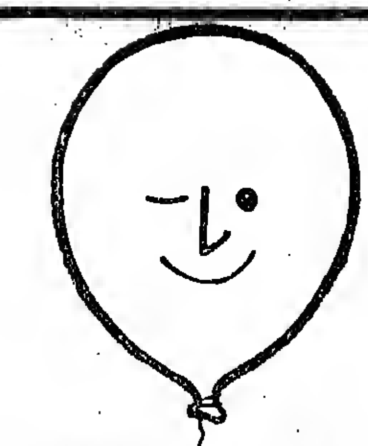
Isvaran uses the 370/155 at Madras Indian Institute of Technology for this work, writing in PL/I and converting either to assembler or machine code. Thus the same compiler can be offered for other microcomputers.

The company has developed a system to control expenditure on parts procurement at the Bhilai Steel Plant; the system at present runs on an IBM 1401, but Isvaran will be converting it to run on a Rjad ES-1020 when the Russian machine arrives.

Isvaran is planning to develop a two or three partition operating system for the Z80, handling simultaneous data entry, data processing and spooling. It seeks overseas contracts for the development of system software.

Getting right down to earth, Data Prep of Madras already has a contract from a US company for punching and verifying mailing lists. It employs 12 people, uses ICL keypunches, charges $6 per 10,000 keystrokes punched and verified and promises to start work on a job within two weeks of receiving the order.

Appointments



RATES:
£10 per single column centimetre

SERIES DISCOUNTS:
7–£9
13–£8
26–£7
52–£5

CHRIS PRIER
Assistant Classified Manager
01-261-8028

LONDON
Eddie Farrel 01-261-8097
Mark Williams 01-261-8019
John Farrar 01-261-8096
Nanette Gibbs 01-261-8174
Josie Poole 01-261-8454

MANCHESTER/GLASGOW
Owen Kelly 061-872-4211

BIRMINGHAM/BRISTOL
Basil McGowan 021-356-4838

COMPUTER WEEKLY—Highest requested circulation at a cost per thousand 25% lower than the nearest competitor.

MYRIAD

SALES EXECUTIVES FOR FINANCIAL SYSTEMS

CENTRAL LONDON c.£10,000

Tymshare is the fastest growing time sharing bureau in the U.K. and is a subsidiary of a leading U.S. Bureau specialising in the solution of complex financial problems. The company market a range of powerful financial application systems aimed at giving senior management direct access to accurate up-to-the-minute information making the vital decision process a quicker and surer one.

Tymshare entered the market place in 1966 and have grown to a company of over 2,500 personnel, running approximately 60 mainframes with a turnover of $150 million. The company have sales and service offices throughout America, the United Kingdom, Western Europe and Japan. They have developed advanced application software and a communication system TYMNET which ranks as the most proven network in the commercial computer services business.

Tymshare have been operating in the U.K. for a little over four years and have already achieved an enviable track record having the fastest growth of any Tymshare subsidiary. To continue this pattern several senior financial marketing personnel are required to augment a busy team operating in Central London.

Applicants should have a strong financial background with ideally sales experience gained in a bureau or systems house environment; additionally applications from candidates with formal accountancy qualifications and a desire to enter a client oriented environment will be given serious consideration. Due to the unique nature of the systems involved, extensive training in the company's financial products is envisaged. Successful candidates will receive an excellent base salary, with potential to achieve earnings well in excess of £10,000 together with generous lease car arrangements and excellent career progression.

To discuss the company and these vacancies in greater detail contact Tymshare's Consultants.

FREELANCE ANALYSTS and PROGRAMMERS

ARE YOU SEEKING AN OPPORTUNITY TO JOIN A SMALL PROFESSIONAL COMPANY (IN A PERMANENT ROLE) WITHOUT TAKING A DROP IN SALARY?

If you have been successfuly as a contract Analyst or Programmer for some while you are now probably considering your next move. Normally to enter the mainstream of commercial employment can mean a dramatic reduction of the high salary you are currently earning (c £9000)

Myriad are currently seeking an additional computer professional to be trained as a Recruitment Consultant. This position offers a high degree of independence, working very much on one's own initiative and can be both interesting and immensely satisfying.

Myriad commenced operations in 1974 and over the last four years has doubled in turnover and size each year; to maintain this momentum requires not only skill and determination in its management but also in each member of the team.

If you feel you may be the person for whom we are looking please telephone to arrange a meeting to discuss the vacancy in detail.

Based in Fleet Street

First Year c £9000

Ref. AW/1910

MYRIAD
30 FLEET STREET, LONDON EC4
01-353 0981

Datasolve Datasolve Datasolve Datasolve

The Knight Contractors stand out from the crowd.

They get a mind-sharpening challenge with every new contract, every new test of their skill. They know the true market value of their experience, and we make sure they always earn it. They can plan their contracts to build experience that can fulfill their highest ambitions. And they know that, wherever they are and whatever they are doing, the strength of Knight Computer Services is right behind them:

This week's contracts – your escape from the crowd.

Operators

European Languages a distinct advantage

UK CONTRACTS

IBM 370/168/158	**IBM**	ICL 1900 GIII Ops. & Data Controllers
OS VS1/2	IBM Data 100	ICL 1900 GII & GII+Ops.
ICL 2960, 70, 80.	IBM System 3 & 32	**OTHERS**
VME/K DME	IBM 370/DOS VS (POWER GRASP & CICS)	Burroughs, Small & Medium Systems
ICL System 4/70/2 & 50	JCL Writers OS & DOS	Honeywell Level 60
J & MULTI System	**ICL**	Terminal & Small Systems
HONEYWELL 66/60 GCOS	ICL 2903/4 Ops.	Various Contracts

For further details or advice on these or other **U.K.** and **European** Contracts, call Sue Smyth, June Mogg or Jane Asbury, NOW! on 01-491 4706 or 01-439 3411.

Programmers/Analysts

Immediate/Forthcoming Assignments

UK
IBM COBOL – CITY
IBM COBOL + OS – BERKS
IBM RPGII + SYS 3/32 – MIDDX
ICL IDMS ANALYST/PROG – CITY
ICL COBOL + GII – E LONDON
ICL COBOL + GII – CITY
ICL COBOL + GII – CARDIFF
PDP RSTS BASIC + – BUCKS
VENTEK DATASHARE – MIDDX
HONEYWELL COBOL – CITY

OVERSEAS
HONEYWELL 66 COBOL – HOLLAND
CDC ASSEMBLER – HOLLAND
MAINFRAME/MINI FORTRAN – HOLLAND
IBM OS SYST PROG – ITALY
ASSEMBLER + CORAL 66 – BELGIUM

Minimum 2 years **FORTRAN + REALTIME**
Contract to 12 months – **BRUSSELS**

3 years experience of **COBOL**. Practical exp. ICL 2980/70/60. Knowledge IBM COBOL. Also IDMS FORTRAN APL PL/1 vacancies – LUXEMBOURG

Please contact Richard Kaluzynski or Suzy Gillam: 01-491 4706 or 01-439 3411.

All vacancies are open to both male or female applicants.

Knight

Knight Computer Services Limited,
14 Old Park Lane, London W1Y 4NL.
Staff Services Division of BOC Datasolve Group and a member of Computing Services Association.

01-491 4706

Make a date

Walk into a Welcome
London Interviews, 6th Nov., Monday
Birmingham, 7th & 8th Nov., Tuesday & Wednesday

Analysts & Programmers

1. Job satisfaction.	?
2. Career prospects.	?
3. Attractive salary.	?
4. Latest equipment.	?
5. Reasonable housing costs.	?

E.M.S. can help you obtain any or all of the criteria outlined which may be missing in your current position. With 3,000 vacancies outstanding we have one major problem.

We're placing candidates so quickly we're always 3,000 people short. Apply today.

So . . . You want a real career?
And a salary to match your ability?
We'll pay 4K, 5K, 6K, 7K, 8K — If . . .
You convince us you have ability!
So . . . Surely . . . if we can give you all you ask . . .
You can give us an hour of your time?
And . . . If the 40 immediate EMS group vacancies
Don't satisfy you on location
We have . . . over 3,000 client vacancies which will!
Note . . . EMS offered over 20 internal jobs a day
last time we did this . . . and . . . placed over 50
candidates in client vacancies
So . . . we're making a major effort to reach you
You've read this far . . . So . . .
You're probably just what we're looking for!
Come . . . and meet this progressive UK group . . .
And . . . we'll develop your career for you . . . After all . . .
We're competing against 3,000 clients for you

Make a date with EMS

ANALYSTS AND PROGRAMMERS—LONDON 4K TO 7K

Candidates with one year or more DP experience are urgently required by hundreds of London and Home Counties clients, prepared to pay attractive salaries in order to attract experienced development staff.
EMS are obtaining as many as five offers for virtually all London and Home Counties staff using our computerised recruitment system. We are literally covering every single installation in the country. No one can afford not to find their next appointment without the EMS recruitment system. You're cross matched against every vacancy, rather than just the two or three advertised each week which appear of interest. Every installation, all hardware, operating systems, languages and applications. How can you compete against EMS? We get results and have thousands of satisfied clients each year.
Just complete the attached application form and see how fast we get results for you. Even better, bring it with you and meet us in London if you can make our walk-in interview date. Otherwise, don't miss the golden opportunity of EMS services on your behalf. We have a worldwide service, second to none. For ten minutes of your time to complete the form, we'll prove it to you.

Consultant—Don Philip/Carol Proudman
Telephone 021-454 7906

IBM ANALYSTS, PROGRAMMERS, OPERATIONS MANAGERS AND SUPERVISORS
KUWAIT c20K PACKAGES TAX FREE

The rapidly expanding Kuwaiti economy requires a large number of experienced DP staff each year to assist with installation development, both within the Industrial and Commercial sectors, and within the Public sector in various Ministries.
Staff are urgently required at all levels from Operations Supervisors to Programmers, Analyst/Programmers, Analysts through to Senior Consultants. Attractive tax employment packages exist with furnished accommodation provided. Numerous new candidates are urgently required for London and Midlands Interviews during the next week. Complete the attached form without delay. Applicants must not have more than two children. Preference will be for candidates with no children.

Consult—John Wood

HONEYWELL ANALYSTS AND PROGRAMMERS—ENTIRE UK £4,000 to £8,500

EMS, as the foremost Honeywell support consultancy within the UK, have a substantial quantity of requirements from most Honeywell users throughout the U.K. for Analysts and Programmers to assist with new developments.
Honeywell hardware is currently experiencing a high demand sales boom, resulting in many new installations being captured and a need for both experienced staff and IBM, ICL staff prepared to retrain on the equipment, to assist hundreds of new users complete development commitments.
Irrespective of your UK location, if you want the best jobs at Honeywell installations, register with EMS. We're where the jobs are, all on our computers waiting for you.

Consultants—Don Philip, John Wood

COBOL, ASSEMBLER PROGRAMMERS—LONDON, MIDLANDS, NORTH 4K TO 6K

We urgently require a minimum of 2,000 experienced Programmers to help fill current client requirements throughout every major town and city within the UK. Clients include Banks, Builders, Computer Manufacturers, Consultancies, Distributors, Engineers, etc. All Programmers, irrespective of background, currently interested in a lucrative new career opportunity, should apply urgently to EMS via the attached application form for interviews in the areas of their choice by every local employer able to offer the job interest and salary required. Hardware includes IBM, Honeywell, ICL, NCR through to minis.
Let EMS develop your career for you. Join thousands of other satisfied candidates.

Consultants—Carol Proudman, Selina Mills, Don Philip

CONTRACT

LONDON & SOUTH £175-£250
Cobol/Plan Progs., City. 8 months.
Honeywell Cobol, Surrey
Honeywell Cobol, Middx.
Honeywell Cobol, Herts.
Honeywell Cobol, Central
Analysts, City.
Analysts, Acton. Urgent.
IBM—Analysts, Herts.
IBM Progs—750, Herts.
ICL Cobol, Herts.
PDP 8 & 11 Programmer. London. Urgent.
PDP and Intel, Herts
Hewlett Packard, Surrey.
IBM OS/MVS Cobol Assembler, Brighton.
Fortran, Various and many others weekly.
Cobol/Progs. Norwich.

MIDLANDS. £150-£225
IBM Cobol
ICL Cobol
Honeywell Cobol/IDS/TDS.
PDP Assembler.
Fortran, Leics. and Notts.

NORTH £150-£225
Honeywell Analysts, N.W.
Honeywell Progs, Cobol, N.W.
Honeywell, Cobol/IDS/TDS, N.W.
Honeywell, Cobol, Yorks. and Teesside.
Honeywell IDS/Cobol Programmer, Hull.
ICL Cobol Progs. Various.
IBM Cobol. Various.
Fortran and Assembler, North.
IBM Cobol DL/1, Doncaster.
Business Analyst/O.M., Liverpool

EUROPE—GERMANY
HOLLAND—SWITZERLAND
Fortran—Univac
PDP—Assembler
Ferranti
IBM—IMS Progs.
IBM—TSO Progs—German speaking.

Telephone urgently for contract forms and early projects or for projects up to 8 weeks ahead.

0782-623665
John Wood, Don Walklate, Selina Mills

TOP SALESMEN AND SALES MANAGER
16K-20K (and it is earnable)

E.M.S. is planning substantial further development of both our Consultants and Turnkey Systems Divisions during the coming months. Our Consultancy activities extend across all mainframe ranges and encompasses a wide range of industrial/commercial organisations. Applicants must, therefore, present a high level of Business Analysis capable of rapidly assessing clients' requirements and proposing consulting solutions where appropriate or qualifying the relevant consulting experience required in either systems or programming and providing the necessary staff from E.M.S. resources. A vast potential market exists for salesmen marketing resource support.
Equally, our Turnkey Systems Division provides total U.K. coverage, marketing Honeywell Level 6 mini-computer systems and supporting software to a wide range of U.K. users.
Experienced Salesmen capable of developing their own territories are urgently required. A substantial quantity of leads are also supplied by extensive and vigorous advertising campaigns and Road Show ventures. Salesmen must possess an adequate mini-computer knowledge for Turnkey Systems positions. Car will be provided with adequate base salaries and high prospective incentives. Apply by telephone for interview during the next week at our Birmingham Data Centre. All U.K. territories will be controlled from the pending regional development of other Centres.
Consultant John Wood

ANALYSTS
HERTS Up to £7200

One of Britain's largest trading groups has a large quantity of outstanding systems analysis vacancies to cope with substantial expansion plans being developed. The client requires candidates to have an IBM background preferably with some programming experience. In addition any IMS or COMMS knowledge would be especially valuable. Excellent working conditions are available with interesting and absorbing projects and good career development opportunities, futuristic applications and a wide range of interesting new products. Relocation assistance will be provided where appropriate.
Consultant Don Philip, telephone 021-454 7906

TURNKEY SYSTEMS—SYSTEMS DEVELOPMENT MANAGER

E.M.S. has embarked upon a further diversification with the funding of a sophisticated new Data Centre based in Birmingham and funding U.K. ... Systems Development. We now require a Senior, experienced Manager ... guiding and directing Analysts in Feasibility Studies with ... sizing of core requirements and drafting of final tenders ... knowledge of systems programming and operating systems ... the successful applicant having previous experience of ... control. Ability to motivate and lead will be an important ... anticipate candidates having a good technical knowledge of Data Processing ... sound commercial knowledge and judgement. Ability to ... case to clients at Board level will be important as will the ... group of between 80 and 280 delegates at annual conventions. ... The successful manager will play a major role in the development of ... Systems Division and must be prepared to accept the pressures ... commensurate with a high growth sector. In order to progress ... opportunities within the company. A bonus scheme is ... management throughout the group and assessed on individual ... The position represents the opportunity of joining a new division ... impact upon management. Experience within a consultancy ... would be advantageous. Age 30 to 50 preferred. Relocation ... appropriate. Apply initially to J. L. Wood, Managing Director ... attached form to the Newcastle office

PROGRAMMERS
HERTS

Britain's first IBM Series 30 site has a large number of ... numerous interesting new development projects ... are urgently sought to work on large project teams. Any IMS ... be especially valuable. Otherwise, general OS/COBOL ...
Relocation assistance provided.
Consultant Don Philip, telephone 021-454 7906

BIRMINGHAM
Phone 021-454 7906
EMS Data Centre
9th Floor, Tricorn House
Five Ways, Edgbaston, Birmingham
Tuesday & Wednesday, 7th & 8th November
First walk into a coffee and welcome
10.00 to 18.00

LONDON
Phone 01-837 8844
President Hotel (near to Euston)
Russell Square, Bloomsbury, London W.C.1
Monday, 6th November
Walk in to a welcome, 9.00 to 20.00 hrs. You'll be in good company.

EMS Consultants Ltd
61 Lower Street
Newcastle under Lyme
Staffordshire ST5 2RS
Telex 36636

EMS CONSULTANTS LTD
61 LOWER STREET
NEWCASTLE UNDER LYME
STAFFORDSHIRE, ST5 2RS
Telex 36636

Management Services & Computing Division
Telephone: 0782 623665/6/7/8
Employment Agency & Employment Business Licence No. M65
(C) Form Design EMS Copyright March 1977

For Office Use only
Company Ref No

SURNAME
Other Names
Address | Telephone Home | Bus. | Ext.
Post Code

Age	Date of Birth	Place of Birth	Nationality	Height	Weight
Married	Children	Car Owner	Driver	Nature of any Serious Illnesses	

Position Required | Required Salary Range
Present Position | Salary

WHERE DO YOU WISH TO WORK

Within U.K.	Yes/No	Acceptable Areas	Abroad	Yes/No
Will you move	Yes/No		Europe	Yes/No
			Middle East	Yes/No

NUMBER OF YEARS EXPERIENCE

Operating	Programming	Systems Design	Systems Analysis	Management	Total

Available for Interviews
Available for Employment

DETAILS OF SECONDARY AND FURTHER EDUCATION

Schools	Date	Examinations Passed
College/University	Date	Examinations Passed

Business Courses with Dates

1. Present Employer | Town
Position | Date Joined

TYPE OF INSTALLATION
Commercial | Bureau | Insurance | Scientific
Manufacturing | Banking | Education | Engineering

HARDWARE	OPERATING SYSTEM	LANGUAGES

Software or Packages
On-Line | Real Time | Time Sharing
R.J.E. | Tele Processing | Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)
Cost Accounting | General Ledger | Manpower Planning | Personnel
Budgeting | Credit Control | Stock Control | Payroll
Forecasting | Order Processing | Production Control | O.R.
Corporate Planning | Marketing | Petrochemicals | Radar
Sales Ledger | Distribution | Linear Programming | Statistics
Purchase Ledger | Traffic Analysis | Simulation

Projects Completed | Responsibilities

2. Previous Employer | Town
Position | Date Joined

TYPE OF INSTALLATION
Commercial | Bureau | Insurance | Scientific
Manufacturing | Banking | Education | Engineering

HARDWARE	OPERATING SYSTEM	LANGUAGES

Software or Packages
On-Line | Real Time | Time Sharing
R.J.E. | Tele Processing | Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN
Cost Accounting | General Ledger | Manpower Planning | Personnel
Budgeting | Credit Control | Stock Control | Payroll
Forecasting | Order Processing | Production Control | O.R.
Corporate Planning | Marketing | Petrochemicals | Radar
Sales Ledger | Distribution | Linear Programming | Statistics
Purchase Ledger | Traffic Analysis | Simulation

Projects Completed | Responsibilities

Reason for Seeking Change
Details of type of position wanted
Additional Information —
Please explain below, in an 8-10 line precis, your current duties and applications experience

FOREIGN LANGUAGES

Spoken	Written	Read

Please show the number of years experience of the following. Where your experience is not specified please use the blank spaces.

HARDWARE		OPERATING SYSTEM		LANGUAGES		PACKAGES/SOFTWARE	
IBM 360/370		DOS		COBOL		FILETAB	
ICL 1900		OS		FORTRAN		DRIVER	
ICL 2960/2970		MVT/MFT		ASSEMBLER		CICS	
ICL 2903		GEORGE 1		PLAN		IMS	
UNIVAC 1100		GEORGE 2		PL1		BOMP	
UNIVAC other		GEORGE 3		RPG 2		O BOMP	
BURROUGH 700/800		MCP		USERCODE		PERT	
BURROUGHS other		Exec 8		AUTOCODE		V SAM	
HONEYWELL 66		GCOS		EASYCODER		IOS/TOS	
HONEYWELL 6000		OS 2000/200		ALGOL		MICROFILMING	
HONEYWELL other		VMEB/VMEK		NEAT		TELEPROCESSING	
NCR		J Level		CORAL		OMS	
ICL System 4				OLI			
PDP							

3. Past Employer | Town
Position | Date Joined

TYPE OF INSTALLATION
Commercial | Bureau | Insurance | Scientific
Manufacturing | Banking | Education | Engineering

HARDWARE	OPERATING SYSTEM	LANGUAGES

Software or Packages
On-Line | Real Time | Time Sharing
R.J.E. | Tele Processing | Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN
Cost Accounting | General Ledger | Manpower Planning | Personnel
Budgeting | Credit Control | Stock Control | Payroll
Forecasting | Order Processing | Production Control | O.R.
Corporate Planning | Marketing | Petrochemicals | Radar
Sales Ledger | Distribution | Linear Programming | Statistics
Purchase Ledger | Traffic Analysis | Simulation

Projects Completed | Responsibilities

PLEASE CHECK THAT EACH SECTION HAS BEEN TICKED APPROPRIATELY

ADDITIONAL INFORMATION
General
Data Processing
Terminals
Software/Packages
Application Areas
Projects and Responsibilities

datascene

OPERATIONS

IBM OS TECH. SUPPORT £6000
Senior & Junior OS JCL people required for various installations in London and Home Counties. Senior people should have some JCL writing experience. Junior positions may suit ex-senior operators and above.

IBM OS SHIFT LEADER £5300
Five years' operating experience required for this C. London installation. Good OS JCL also necessary. Perks include cheap mortgage and loans, etc.

ICL GII SNR. OPERATOR £4500
Operators with 18 months + experience required for C. London installation, working 3 shifts with very limited nights. Excellent career prospects.

IBM DOS	SNR. OP.	2YR.	C. LONDON	£4800
IBM DS	OPERATOR	1YR.	C. LONDON	£4300
IBM OS	SNR. OP.	2YR.	N. LONDON	£4700
IBM SYS. 3	OPERATOR	1YR.	N. LONDON	£4000
ICL GII	SNR. OP.	2YR.	W. LONDON	£4700
ICL GII	OPERATOR	1YR.	N. LONDON	£4000
BURROUGHS MCP	SNR. OP.	2YR. +	C. LONDON	£5000
UNIVAC EXEC 8	OPERATOR	6MTHS.+	W. LONDON	£3600
NCR ANY	OPERATOR	1YR. +	C. LONDON	£4300

DATA CONTROLLERS—WE HAVE MANY VACANCIES IN ALL AREAS, £3000-£5500

DATASCENE RECRUITMENT LTD
Sceptre House
169-173 Regent Street
London W1R 7FB
01-439 7871
24-hour answer phone

MINI / MICRO SPECIALISTS

THE COMPANY: **Salary up to £8,000+**

Paramin is an American Systems House, with a difference. We specialise, primarily, in 'state-of-the-act' projects on Mini and Micro Computers. Currently, we are in the process of opening an office in Maidenhead, Berkshire, to complement our American and Belgian offices.

Paramin has been built around its people. We subscribe to the 'small-company' philosophy, in as much as none of our offices exceed thirty people. We find that this allows us to maintain a friendly, personable environment, while building a highly professional team of individuals who are motivated by technically challenging projects.

The people we are seeking are very special. They are very technically competent, yet are sufficiently 'business-orientated' to represent our company in negotiations with our clients. Their backgrounds may vary from a mini manufacturer to a highly sophisticated user. An example of the qualifications required is given below. If you are interested in us as a company, but do not meet all the criteria, give us a call anyway, so that we can explore the possibilities.

IDEAL QUALIFICATIONS

- Degree in a science subject
- Minimum of two years' experience
- Knowledge of at least one Assembler Language.
- Knowledge of high-level, structured language.
- Good experience in communications.
- Good experience in Software Design
- Background of work on challenging projects.
- Expertise in at least one mini / micro system.
- Consultancy experience.
- Point of sale.
- Industry experience in
  - Electrical supply
  - Oil
  - Process Control
  - Banking / Finance / Insurance

If you think that we have got something in common, call:
Chuck Backett
Littlewick Green (0628-82) 2166. Ext. 402

COMPUTER OPERATORS

A number of vacancies exist for Computer Operators to work with Harwell's IBM 370/168 computer. This computer provides a central service to several hundred scientists, both on site, and in other laboratories via remote terminals.

Previous experience of computer operating is desirable, but training will be given to suitable candidates, who must be over 18 years of age.

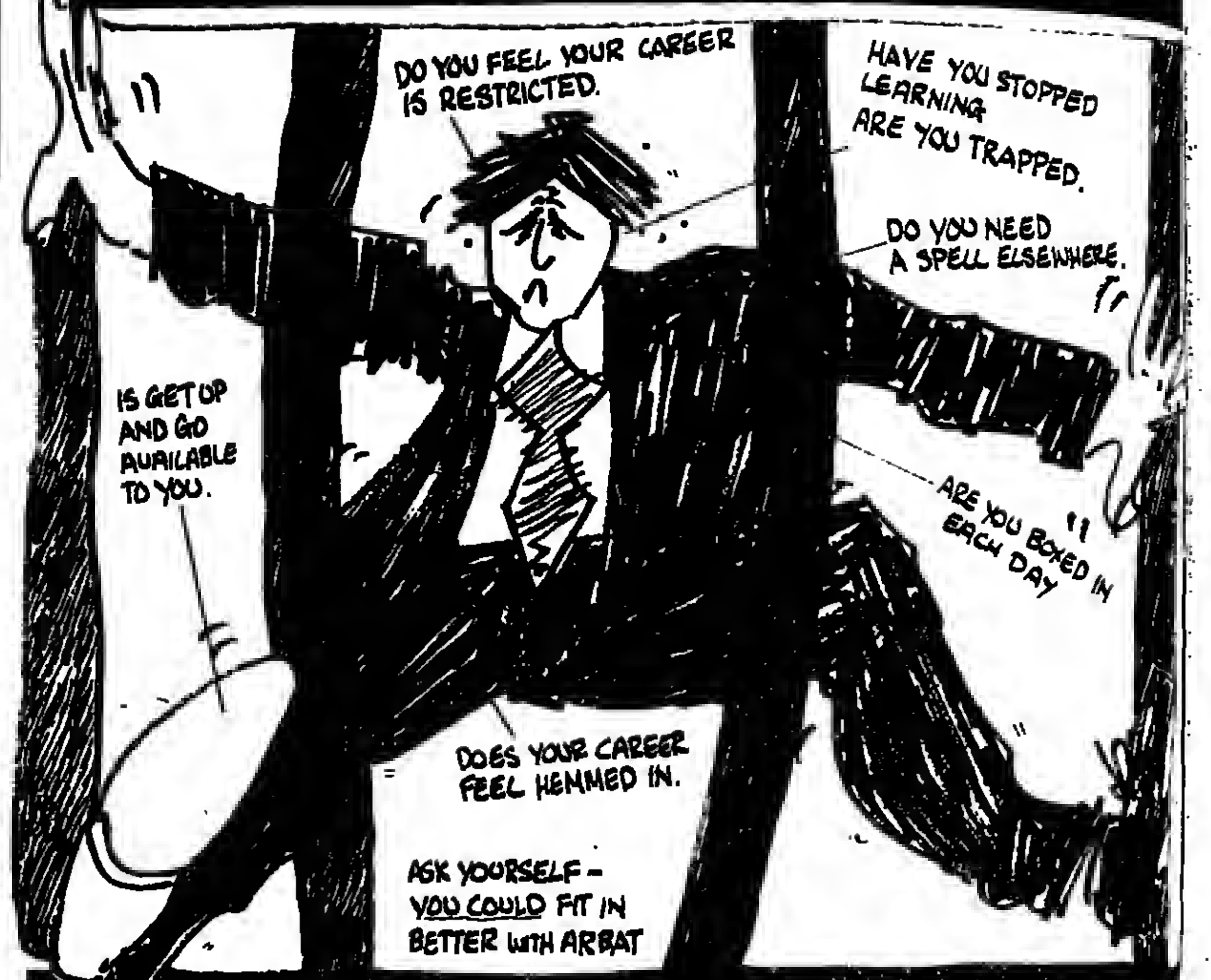
There is a basic working week of 42 hours in 5 days, but Data Processors must be available for shift work throughout the 24 hours.

Pay ranges from a minimum of £31.76 p.w. as a Trainee, to a maximum of £53.66 p.w. for a fully trained Data Processor. In addition allowances of up to 17½% of basic pay are given for shift work.

For further details and an application form, please contact:
Mrs R.A. Stevens, Personnel Department,
United Kingdom Atomic Energy Authority,
Harwell, Didcot, Oxon, OX11 0RA.
Telephone Abingdon (0235) 24141 Extension 2946

HARWELL

Programmers, Analysts



DO YOU FIT?

ARBAT is a real success story of British Computing...

Real Time Banking and Communications Systems are our areas of expertise—Currently [illegible] the top 50 Banks use ARBAT systems.

UK and International projects are underway and we offer sound careers in Programming and Systems, in a dynamic and exciting environment.

Initially London based then overseas opportunities—Salaries are by negotiation, and we have a reputation of being top payers—Reviews are at least twice in year one—We offer continuous training for the future.

All ARBAT jobs are 'TASK' orientated—and career progression is on merit and from within.

Want to hear more about the other benefits—We will send you a profile on ARBAT—and arrange interviews locally—Phone or write NOW to discuss the opportunities with:-

ARBAT (UK) LTD.
Morris Hogg at ARBAT (UK) Ltd.
160 Queen Victoria St., London, EC4V 4DA
Office No. 01-248 6499
Home No. CHESHAM (02405) 71576 after 8pm.

datascene

BASIC PROGRAMMERS

We have urgent requirements for BASIC / BASIC + PROGRAMMERS / ANALYSTS with experience at all levels.

The companies range from in-house users of all sizes to large software houses.

City	2 yrs	PDP11	To 5½k
City/Bucks	12 mths. +	PDP11	to 7½k
Herts	12 mths. +	MINI	to 5½k
C. London	12 mths. +	MINI	to 5½k

Salaries & prospects are excellent for all the positions and perks very from season-ticket loans & LVs to company cars & subsidised mortgages. For more information please ring at once.

Datascene Recruitment Limited
Sceptre House
169-173 Regent Street
London W1R 7FB
01-439 1856
24 hour answer phone

COUNTY OF SOUTH GLAMORGAN
TREASURER'S DEPARTMENT

PRINCIPAL SYSTEMS ANALYST
PO 1(2) £6080-£6702 p.a.*

Required in the Accountancy Division at County Headquarters, Cardiff, to liaise with user Departments and the Computer Manager, current and proposed computer applications and information requirements to improve planning, direction and control; assist and review computer based systems and advise County Treasurer on computer matters. A minimum of several years' experience of computing and at least two years in system design, preferably of on-line systems, and a knowledge of commercial applications is desirable. Full job description available with application form.

ASSISTANT SYSTEMS ANALYST
APB £4773-£6073 p.a.*

Required in the Accountancy Division at County Headquarters, Cardiff, to be responsible to the Principal Systems Analyst for the detailed design and implementation of computer based information processing systems, and the successful applicant may also be required to undertake some programming for specific applications. Previous experience of systems analysis and COBOL programming for commercial applications required. Full job description available with application form.

SENIOR CONTROL ASSISTANT
APB £4773-£5073 p.a.*

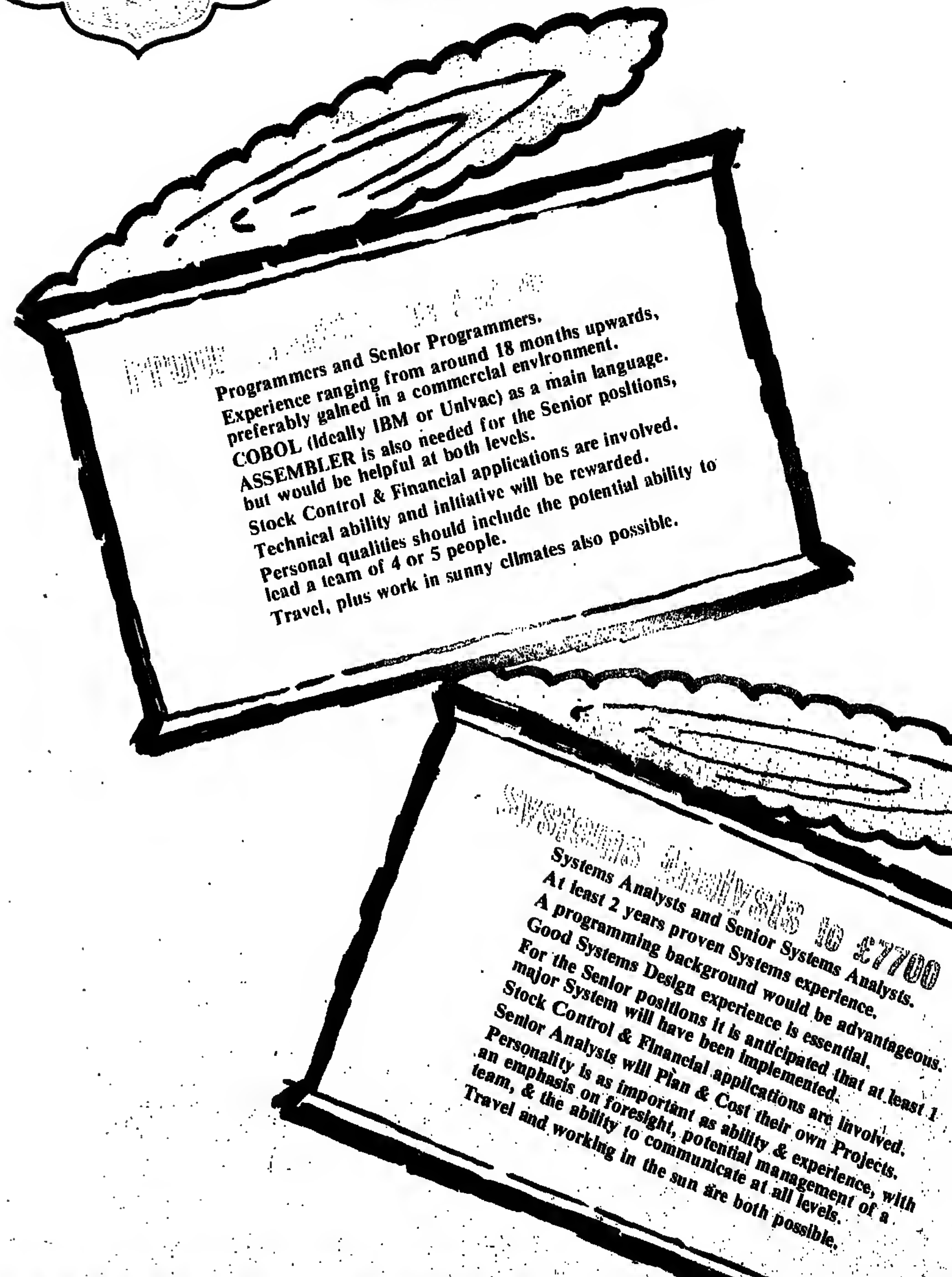
Required in the Accountancy Division at County Headquarters, Cardiff, to be responsible for computer control functions in relation to financial applications in the County Treasurer's Department, including supervision of computer terminal staff. Experience in R.J.E. terminal operation and control of input and output for a wide range of financial applications required. Full job description available with application form.

*The salaries quoted include a supplement which will not count for overtime and other similar enhancements.

Application form, returnable by November 13th, 1978, available from the Personnel Officer, 9th Floor, County [illegible] Newport Road, Cardiff (Tel. 0222 499022 [illegible]

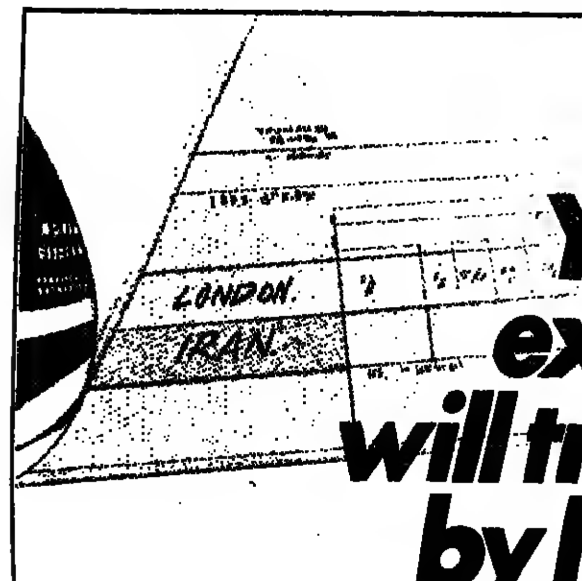
we can-can you?

Del Monte *are the world's largest fruit and vegetable canners. Based in West London, they currently require DP professionals in two main areas.*



If you consider these vacancies could be of interest to you please contact Datascene at once

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB
datascene
01-439 7871
24 hour answer phone



Your DP experience will travel faster by helicopter

On behalf of Bell Helicopter International, IAL are recruiting data processing professionals for a two-year contract in Iran. It is an exciting project, involving the supply of a logistics and training support service to the Imperial Iranian Army Aviation and demanding extensive data processing facilities.

A large integrated data base has already been established housing the flexible Honeywell 6000 system and the wide cross-section of DP talent we require will certainly benefit from two years in Iran.

Programmer Analyst

Four years' experience is required with at least two years' of recent Honeywell experience, utilising COBOL 68 and Integrated Data Store (IDS) programming language.

Software Analyst

Two to five years' experience is desirable in the area of software support and maintenance for Honeywell's GCOS and TSS, GMAP programming.

Data Base Analyst

Two years' recent experience is required in designing and maintaining data bases, utilising IDS utilities. Knowledge of IOS internals is desirable.

Teleprocessing Analyst

Three years' experience is required in the area of software support and maintenance for Honeywell's TDS. Knowledge of GRTS/NPS and GMAP programming.

Systems Analyst

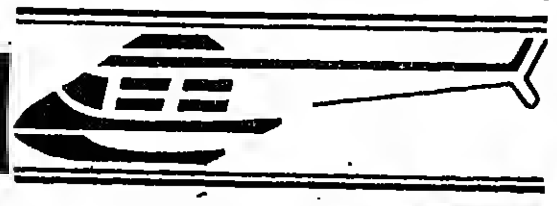
Broad experience is required in defining user requirements for the development of data processing systems/program specifications in the area of financial or aerospace engineering and production systems.

As part of the Bell Helicopter International team, experience is not the only benefit you will derive from a two-year contract.

You will also receive a tax-free salary, a housing supplement of £365 per month plus a child allowance of £480 pa if accompanied. In addition, generous relocation assistance will help you make the transition from the UK and there are free flights home with leave arrangements.

There is nothing to lose and plenty to gain from spending two years in Iran, so write with brief cv quoting ref. no. 7768 to The Recruitment Officer, IAL, Aeradio House, Hayes Road, Southall, Middlesex. Tel: 01-574 5021.

IAL



Bell Helicopter International Bell Helicopter TEXTRON

---

12 DOS COBOL PROGRAMMERS REQUIRED FOR EUROPE OR LONDON

IMMEDIATE OR JANUARY START

RING: MARCOL 01-402 9355

UMIST

Research Assistant in Information Retrieval

A Research assistant (male or female) is required in the Department of Computation. Applicants should be interested in one or other of the following areas

A) Information Retrieval: Current projects include a corrosion data base, the use of a microprocessor for an intelligent interface to international on-line systems and personal information systems. Applicants should have an Honours Degree in Computing, preferably with a bias towards data processing and information handling aspects of computing

B) Program Design: This project is concerned with the automation of program design using the Michael Jackson Technique. Although working knowledge of both COBOL and the Michael Jackson Technique is essential knowledge of COBOL on PDP machines is also desirable

Starting salary will be up to £3 881 per annum on Range 1B

Letters of enquiry, giving details of qualifications and career to Professor B. Richards, Dept. of Computation, UMIST, P.O. Box 88, Manchester M60 1QD

Please quote reference COM/911IC(A) or COM/U8SC(B) as appropriate

---

EUROPE **U.K.**

THE GEMINI CONTRACT STAKES TALK STRAIGHT TO THE HORSES MOUTH....

or at least to the right end of the horse!

We are the U.K. Company of the Cap Gemini Sogeti Group, Europe's largest software services operation.

We have routine daily contact with 50 branches operating in 14 different European countries.

Why complicate things by dealing with middlemen? Come and register with us for first class deals in Europe and the U.K.

Phone Pat Forde on 01-828 6634 (daytime) or 01-223 6713 (evenings) for further information and starting prices.

GEMINI

Manchester: Gemini Computer Systems Ltd., Roberts House, 90 Manchester Road, Altrincham WA14 1PL Tel 061 941 1925

CLASSIFIED COPY

All classified copy should reach our offices no later than 5 p.m. on the Monday preceding Thursday's publication; complete artwork is supplied 12 noon on a Tuesday.

Ring Ian Carter for further details on 01-261 8018

DEVELOPMENT OFFICER

Scotland — up to £6,237

Scottish Gas have a vacancy, due to reorganisation at their Supplies HQ, Livingstone.

You will be responsible to the Stock Accounting and Development Manager for the development of computer and clerical systems within the Supplies function. Working in close co-operation with other departments, in particular Management Services your main duties will include: Monitoring the effectiveness of existing systems; specifying new systems to cope with changing circumstances, and improvements to existing systems; in close conjunction with Management Services, developing those systems, implementing and maintaining; ensuring that all systems and procedures are adequately documented; carrying out management and staff training as necessary for the successful operation of all systems.

Educated to degree standard you should have several years' experience of designing systems, and a background knowledge of stock control and stores procedures would be useful.

Salary is in the range £5,253–£6,237.

Applicants, male or female, should write giving details of age, experience and qualifications to Appointments Officer, Scottish Gas, Granton House, West Granton Road, Edinburgh EG5 1YB. Closing date for applications 16th November, 1978.

SCOTTISH GAS

UNIVERSITY OF LIVERPOOL

Computer Laboratory

Applications are invited for the post of

SECTION MANAGER (SYSTEMS)

The initial salary for this post will be within the range £6080–£7754 (under review).

Applications are also invited for two newly-established posts in the area of

MICROPROCESSOR SYSTEMS

Appointments to these posts will be made on the following scales (under review).

Programmer/Analyst	£3883–£6604
Senior Programmer/Analyst	£6604–£6556
Principal Programmer/Analyst	£6555–£7754

Initial grade and salary will be determined according to qualifications and relevant experience.

For all posts a degree in Computer Science or a numerate discipline is normally required

Application forms and further particulars may be obtained from the Registrar, The University, P.O. Box 147, Liverpool L69 3BX.

The closing date for receipt of applications is 17th November, 1978 and it is hoped to hold interviews towards the end of November.

Quote Ref. RV/985/CW.

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

PROGRAMMING CONSULTANT

LONDON — To £7000 + Profit Sharing

Joining a software house can be an exciting experience; becoming a member of a dedicated team of system and programming professionals engaged in a wide variety of projects on hardware ranging from Data General and Hewlett-Packard to ICL 2960 and IBM 370/158.

System applications vary dramatically from small in-house turnkey projects to major on-line real-time systems. The position offers career progression; exposure to several manufacturers' hardware working on pure development applications together with an excellent salary and benefit package

Ideally you will have at least 3 years' experience of COBOL, with the ability to cope with dynamic situations — react to client requirements and pressures whilst at the same time maintaining control of a development project. Such skills are frequently under-developed in Senior Programming staff and this opportunity to gain such experience of client oriented situations makes this an excellent opening to move into a consultancy role.

ref. E4/21

24-hour answering service

Please telephone for a confidential discussion or write to: 30 Fleet Street, London EC4Y 1AA

COMPUTER PERSONNEL APPOINTMENTS LTD.

Career Specialists and Consultants for

D.P. MANAGERS, SYSTEMS ANALYSTS, PROGRAMMERS AND OPERATORS

Midlands, Northern Counties and Scotland

For registration forms apply to

65 New Street, Birmingham B2 4DU. 021-643 0981 or Tel. 01-328 7261

STEVENAGE COLLEGE
DEPARTMENT OF BUSINESS AND PROFESSIONAL STUDIES

LECTURER GRADE II IN DATA PROCESSING AND ACCOUNTING

Applicants are invited from suitably qualified persons for the above post, which is tenable from 1st January, 1979. Salary Scale £4101–£6658 per annum.

Further details and application forms, returnable within 14 days of the appearance of this advertisement, are available from the Principal, Stevenage College, Monkswood Way, Stevenage, Herts SG1 1LA.

SYSTEMS OPPORTUNITIES WITH PPP in Tunbridge Wells c. £6,000 P.A.

PRIVATE PATIENTS PLAN was formed nearly thirty years ago. Its objective, to provide alternative medical facilities to people for a low monthly outlay.

Since its inception it has grown steadily till today when its turnover exceeds some £20,000,000 per annum.

Throughout these thirty years it has needed not only to grow in financial terms but also in efficiency and technical knowledge in order to keep up with the growing demand for private medicine and a vastly more sophisticated medical world.

Part of its need for increased efficiency has been met by the installation of a new ICL 2950 system.

This has enabled PPP to plan some very sophisticated on-line systems. These systems are mainly in the financial and accounting areas and are to be run under DME and will employ ICL 7561 VDU's of which the company plan to install some 20-odd.

Apart from a possible opening for a senior systems analyst at a higher salary band these openings are for analysts with a year's plus systems experience that are interested in joining a medium-sized installation where they can have the opportunity of taking systems from feasibility to implementation: be given good on-going training; work in very modern, bright offices; have a job with a future and lastly to be with a company that has very good terms of employment.

Applicants wishing to discuss this appointment should telephone KEITH DUNCAN during office hours at the number shown below or between 7 and 10 p.m. any evening and weekend at Crowborough (08926) 6545, quoting ref. CW59.

James Duncan & Associates 01-248 3407
Prince Rupert House, 64 Queen Street, London, EC4

CONTRACTS PL/1 N.W. Kent and London — IDS or TDS London and Surrey — DL/1 Holland — PLAN Hants

Start dates are immediate up to end of the year. Contact TRICIA PERRY on 01-248 3407 during office hours or Brentwood (0277) 213262 evenings and weekends.

JBA

Senior Mini/Micro Engineers

London — **to £10,000**

SCICON, a member of the BP Group of Companies, has an international reputation for the advanced application of mini and micro computer technology. Planned growth in the development of hardware/software systems has created opportunities for high calibre engineers to join their specialist Hardware and Engineering Services Division.

The work is highly varied and interesting. If you have broad experience which includes some of the following:

- –Minicomputer hardware/peripherals
- –Logic design
- –Engineering laboratory practice
- –Product/prototype development
- –Analogue interfacing
- –Data communications
- –Formal quality assurance
- –Site engineering/supervision

SCICON *can offer a challenging career and an environment where initiative and commitment are encouraged and rewarded. Good starting salaries and excellent conditions of employment also apply.* Contact: Margaret Stevens

OR Analyst

London — **up to £6,500 +**

Opportunities to join the research department of this large organisation do not occur very often, where the requirement for personnel is due to increased work loads rather than staff turnover.

The work involves Critical path analysis, simulation, financial planning and mathematical modelling, incorporating on-line and interactive programming in FORTRAN on mini-computers.

Candidates must have a numerate degree and at least 18 months experience of OR work.

Salary commensurate with suitability but not likely to be less than £5,500. Contact: Mike Creamer

Programmer

London Base — **Min £5,500 + car and bonus**

We have been retained by a highly successful manufacturing group to recruit an Application Programmer to join a small software group. The team is responsible for providing the group with the necessary expertise to help implement new installations and systems. Candidates will essentially be good COBOL programmers, have extensive experience of commercial applications and a willingness to be retrained on DEC minis. In addition, previous involvement with multi-programming and VDU systems would be an advantage.

This is an excellent opportunity to work with professionals in sophisticated and original environments.

The post involves extensive UK travel. Contact: Margaret Stevens

Programmer Technicians

Surrey — **Start to £6,900 or £9,000 + BUPA**

This company specialises in the provision of conversion services to installations changing or upgrading their hardware. They require COBOL technicians, particularly those with UNIVAC or HONEYWELL 66 level experience, who enjoy programming and wish to keep in touch with the most modern ideas and equipment. Candidates already at a Senior level will be considered for Project Leading positions, with salaries c £8-9,000.

Their Richmond H.Q. services both the UK and Europe, so after initial training you may well find yourself spending short periods on the Continent – supported by generous tax-free allowances on top of your salary. If you relish the idea of travel and variety, and look forward to a technical career, you may fit in to this exciting environment.

First class training and promotion opportunities, relocation expenses and free life and health insurance. Contact: Andy Wright

Systems Manager

Somerset — **£6,500 - £7,000**

This highly successful electrical component manufacturer has retained JBA to help recruit a Systems Manager to run their relatively new PDP11/34 installation in Somerset. It is a small and very professionally set up site, running various commercial on-line systems under RSTS/E, using BASIC + as the programming language.

Ideal candidates will have a good commercial systems background, allied to relevant DEC experience, and be the type who enjoy taking on a great deal of responsibility – involvement with all aspects of the D.P. department's work will be inevitable, in such a small intimate environment.

Apart from the quality of life naturally associated with living in the West Country, the position offers a reasonable salary plus BUPA and a generous holiday entitlement. Relocation expenses will be available where necessary. Contact: Andy Wright

COBOL Programmers

London & Home Counties — **up to £6,000**

A large international organisation has a number of opportunities for programmers at both junior and senior levels, to work on commercial development projects.

Candidates should have a minimum of eighteen months experience of COBOL on either IBM or ICL mainframes. Senior programmers should be able to demonstrate a substantial background in commercial applications. Other languages, such as PL/1, RPG2 or PLAN would be considered. Training will be available where appropriate.

Excellent salaries, fringe benefits and career prospects. Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant.

If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

FIFE REGIONAL COUNCIL FINANCE DEPARTMENT

COMPUTER PROGRAMMERS

Salary: £3933/£4461 + £312 supplement

Qualification required: At least two years' COBOL experience. The Region has an ICL 1903A configuration, but this will shortly be replaced by an ICL 2980. A wide variety of work is undertaken and careers prospects are excellent.

Application form and further details may be obtained from: Regional Personnel Officer, Fife House, North Street, Glenrothes. Tel. Glenrothes 754411. Ext. 245/6, to whom completed form should be returned not later than 9th November, 1978. Please quote Ref. Number HP/482/382/CW.

FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY

Ring Eddie Farrell or Mark Williams on 01-261 8028 01-261 8019

NORTH WESTERN REGIONAL HEALTH AUTHORITY
HEALTH CARE COMPUTING

A vacancy exists in the Health Care Activities Project Team for a

PROJECT LEADER

with special responsibility for the Child Health computing system. Applicants should have experience of systems analysis.

Salary scale £5537–£6718 per annum.

Application forms and job description from Regional Administrator, North Western Regional Health Authority, Gateway House, Piccadilly South, Manchester M60 7LP, telephone number 061-236 9456 Ext. 425. Closing date 9th November 1978. Please quote reference number 1660A.

For an informal discussion on this post, please telephone John Barry on 061-236 9456 Ext. 305.

FIELD SERVICE MANAGER

NEW POSITION — **c £8,500 + CAR**

A highly successful British systems company has developed over 2,000 installations in its 18 years of trading, and has just created a new position of Field Service Manager to be responsible for their service facilities in London and Home Counties. This could be your chance to get ahead in a friendly and professional company marketing prestige products. If you are seeking a stimulating environment in which to develop your management skills and feel that you can handle the challenge of the above position — CALL NOW.

REF. EK2129 (CONSULTANTS)

AB EXECUTIVE (KINGSTON) LTD. 01-546 9473

£12K + SALES Eastern Region
Self motivated with a technical background and proven success in selling high quality computer peripherals or terminal systems, knowledge of data entry, information retrieval and data comm. techniques useful.

c£8K ANAL/PROG Luton
Your DEC experience will be appreciated in this scientific environment with a small high technology company - part of an international group.

c£5.5K RPG2/SYS34 London EC
At least two years experience with IBM System 3 or 32 needed for this banking client. Full banking perks.

Many more unadvertised positions

COMPUTECH SYSTEMS & PERSONNEL
168 Finchley Road, London NW3 6HP

THE LONDON HOSPITAL MEDICAL COLLEGE
(University of London)

SUPERVISOR OF COMPUTER SERVICES

Applications are invited for the above post from graduates and/or those holding an appropriate professional qualification.
The appointee will be in charge of the computer section which has a staff of five currently. A PDP 11/10 computer is used for both local processing and as a remote terminal to the computers in London University.
The post requires both administrative and programming ability, a first degree in mathematics would be helpful though not essential. Applicants should be graduates or have an equivalent professional qualification.
Salary will be on the Grade II Scale, £6,317 to £7,764 plus £450 London Allowance per annum. Superannuation within the USS.
Further details from the Secretary, The London Hospital Medical College, Turner Street, London E1 2AD, telephone 01-247 0644, ext. 47, to whom applications (two copies), together with names of two referees, should be sent within 21 days.

CONTRACTS

MIDLANDS AND NORTH ENGLAND

IBM	
IBM 370 PL/1 PROGRAMMERS — MIDLANDS, Bristol	c.£220
IBM COBOL OS PROGRAMMERS — NORTH WEST	c.£220
IBM COBOL PROGRAMMERS — SCOTLAND	c.£220
IBM IMS PROGRAMMERS — MIDLANDS, NORTH WEST	c.£245
IBM CICS ASSEMBLER PROGRAMMERS — NORTH WEST, MIDLANDS	c.£245
IBM CICS DL/1 PROGRAMMERS — MIDLANDS	c.£245
ICL	
ICL 2960 VMEB FORTRAN PROGRAMMER — NORTH WEST	c.£220
ICL 1900 GII GIII COBOL PROGRAMMERS — NORTH WEST, MIDLANDS & SCOTLAND	c.£215
ICL 1800 PLAN PROGRAMMERS — MIDLANDS	c.£220
OTHERS	
HONEYWELL L66 IDS/TDS PROGRAMMERS — NORTH WEST	c.£250
HONEYWELL L66 GCOS/COBOL PROGRAMMERS — YORKSHIRE, NORTH WEST	c.£225
HONEYWELL L66 COBOL PROGRAMMER — SCOTLAND	c.£220
PDP DIBOL PROGRAMMERS — NORTH WEST	c.£220
PDP RSX11 PROGRAMMERS — MIDLANDS, NORTH	c.£230
REAL-TIME PROGRAMMERS — NORTH WEST	c.£220
HONEYWELL L66 COBOL — HUMBERSIDE	c.£220

Computing Services Association

Knight Programming Support Limited
143/144 ROYAL EXCHANGE MANCHESTER
Telephone: 061-833 9341/5
Midlands 021-236 1784 ext. 223

Our Client is a leading international computer systems supplier with a substantial UK sales, support and service operation. The principal product lines are mini computer related and serve the OEM, commercial and technical market places. The products are technically excellent and are presently enjoying substantial success.

This is a key post in our Client's strategy to support a rapidly expanding customer base. The emphasis is on customer software training encompassing operating systems, compilers and utilities.

You should have:–

* LECTURING EXPERIENCE OR EVIDENCE OF THE ABILITY TO COMMUNICATE COMPUTER-RELATED KNOWLEDGE.
* MINI COMPUTER EXPERIENCE TO INCLUDE A KNOWLEDGE OF REALTIME OPERATING SYSTEMS AND ONE OR MORE HIGH LEVEL LANGUAGES IDEALLY COBOL
* A RELEVANT DEGREE OR ACADEMIC QUALIFICATION

The Company, located in pleasant rural surroundings with low-cost housing available close by; offers a relocation package, where relevant.

CONTACT: Advising Consultant Richard Champion on 021-236 3781 or Hagley 4166 after Office hours. REF CW/11/2.

SPECIALIST COMPUTER RECRUITMENT LIMITED

SCR

BIRMINGHAM 021-236 3781
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 3JY

MANCHESTER 061-833 0427
Freepost, Blackfriars House, The Parsonage, Manchester M3

LONDON 01-935 0671
Freepost 13, 3 Mandeville Place, Wigmore Street, London W1M 5LB

COMPUVAC COMPUTER SERVICES

SYSTEMS & PROGRAMMING

SYSTEMS SUPPORT to £9,000
This job requires an in depth knowledge of ICL 2900 VME II software W. London.

ANALYSTS to £7,000
This large London based bureau offers a high degree of customer contact. You will be working on new systems, or re-designing existing ones. If you have some commercial systems experience and would like more details, call us now!

COBOL PROGRAMMERS to £5,900
This West London company offers exceptional prospects. If you have a background of commercial cobol and are ambitious call for further details.

ALGOL PROGRAMMERS to £6,500
Current vacancies exist for people with a background of scientific programming in Algol 60 or 68 North London, West London and Surrey.

CONTRACT PROGRAMMERS to £280 p.w.
For our latest contract requirements in London and the Home Counties, call Chris Green now!

OPERATIONS

ICL OPERATORS to £6,500
This London based bureau offer high financial rewards and tremendous job satisfaction for experienced 1900 & 2900 ops

IBM SHIFT SUPERVISOR £6,300
Responsible supervisor required for top rated organisation. You need at least 5 years experience of 370 DOS POWER/VS, and be capable of transferring to MVS within a year.

NCR OPS £4,800
Any NCR mainframe experience. Investment company offers immediate opportunity to extend skills on latest equipment

IBM SUPPORT. DAYS ONLY £5,000
Central London Croydon Mobile. You should have a thorough working knowledge of 370/DOS JCL & UTILITIES, plus the ability to communicate and work under pressure

JUNIOR OPERATORS. TOP PROSPECTS to £4,000
Any ICL experience provides the entry to the ICL NEW RANGE 2980's within the insurance business

Large IBM user in the shipping trade, are seeking junior staff to develop their knowledge on the latest 370 operating systems. For all the best operating and data control jobs, CALL NOW and speak to ex operators who know the game!

COMPUVAC

01-248 6367 24 hour answering service

SURREY — HANTS. — SUSSEX

WOKING	SYSTEMS PROGRAMMER	£8,500+
FARNBOROUGH	SENIOR ANALYST	c7,000
BRIGHTON	OPERATORS	£4,000+
CAMBERLEY	SENIOR OPERATOR	£4-£5,000
FLEET	PROGRAMMER/CONSULTANT	£6-£8,000
CHICHESTER	ANALYST/PROGRAMMER	c£5,500+

BOB WILLIAMS knows the Southern Market. Telephone today! for an early interview.

Management Personnel
Recruitment & Selection Consultants
2 Tunsgate Guildford Surrey
GUILDFORD (0483) 65566

The Certified Diploma in Accounting and Finance
the qualification in accounting and finance for all non-accountants
Telephone 01-636 2967

Chief Analyst

Applications are invited for the post of Chief Analyst in the Computing Services Department. The successful candidate will be responsible for the systems required by the Administration (e.g. Student Records System).

The Polytechnic has recently installed a DEC-20 to replace a 1905E and the Administration programs are currently being converted.

This post will require a good working knowledge of COBOL preferably gained on DEC-10 or DEC-20 systems. However, knowledge of ICL 1900 COBOL or RPG will also be an advantage. It is unlikely that an applicant who has worked for less than three years with COBOL will be considered sufficiently qualified.

Salary SO1—£4620-£5268 plus supplement

Further details and form of application available from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham. Closing date: 17th November 1978.

TRENT POLYTECHNIC NOTTINGHAM

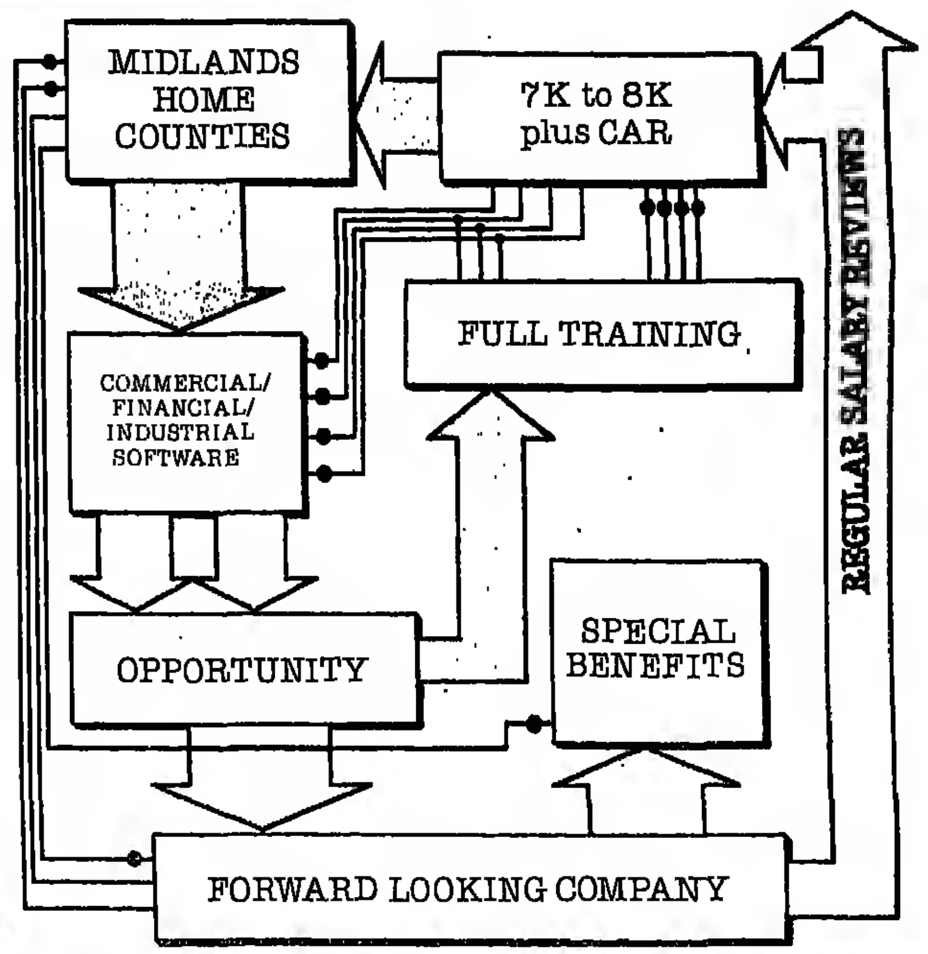
MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

POST SALES SOFTWARE SUPPORT

SALARY: 7K to 8K + Car (with Radio Telephone).
AREA: Coventry/Burgess Hill base for U.K. coverage.
EXPERIENCE: Mini-Computer Software Packages with a background of Cobol/Fortran/Basic Languages.
OPPORTUNITY: The U.K. Division of this multi-million dollar American company is creating an entirely new Software Support team to provide both Technical and Consultative facilities to a large number of new and established clients.
FULL TRAINING: Full training on all software packages will be provided both initially and on a continuing basis.
FORWARD LOOKING COMPANY: The company manufacture powerful mini and micro computers for a wide range of commercial and industrial uses. Their success has resulted in over 18,000 systems installed worldwide. Always at the forefront of technological advances, their activities are constantly highlighted in the International and Trade press.
SPECIAL BENEFITS: Free BUPA; Free Life Assurance; Contributory Pension Scheme (5% of salary); 20 days Holiday p.a.

For positive career advancement, contact Tony McGrath



Suite 201/6, Albany House, 324 Regent Street, London W1R 5AA 01-637 9611 **MANAGEMENT & EXECUTIVE SELECTION**

SYSTEMS ANALYSTS
NORTH SURREY To £7,000
With a minimum of 2 years commercial systems experience on any machine you will be involved in developing new on-line systems. Opportunity of project leadership

SENIOR SYSTEMS ANALYSTS
WALTON-ON-THAMES To £6,600
As a result of recent expansion there are vacancies for applicants with at least three years systems experience. You will be involved in the development of new distribution and stock control systems in this large companies computer centre. Database and previous programming experience an advantage

PROGRAMMERS
WEST OF LONDON To £5,800
Programmers at all levels are required to provide detailed programs for systems specifications. Commercial experience and knowledge of COBOL essential

ANALYST PROGRAMMERS
NORTH SURREY To £5,800
Around 3 years programming experience on any mainframe, using COBOL is required for this position. A programmer wishing to move into analysis will be involved in development and maintenance work. Progression to supervisor of programming team possible

Please telephone for details and an application form for these and other vacancies

AMES PERSONNEL
Employment Agency Suite 14, Dryden Chambers, 119, Oxford Street, London W1R 1PA Tel: 01-434 1106

Metro, The West Yorkshire Passenger Transport Executive

SYSTEMS OFFICER
(REF: PHO 3/3)
Salary Range £4,810-£5,491 (award pending) plus car user allowance

Applications are invited only from persons with relevant experience for the post of Systems Officer based at our Headquarters in Wakefield, due to the current post holder securing promotion within the Executive.
The main duties of the appointee will be to develop and manage the operational aspects of our route costing system, to co-ordinate and develop the implementation of management information and to develop computer bus and crew scheduling and rostering, together with ancillary operational aspects of computer use such as timetable preparation.
Experience in computer scheduling developments and applications is highly desirable together with an appreciation of the workings of management information systems and the importance, role and basis of route costing.

Application forms are available from the Personnel Manager, WYPTE, Metro House, West Parade, Wakefield, WF1 1NS (Tel. 0924 78234 Ext. 284) to be returned no later than 17th November, 1978.

Metro

Experienced Programmer
Up to £10,000 tax-free Saudi Arabia

Our client is a successful computer services company in Riyadh. They now require a Programmer with 2 to 3 years programming experience on Hewlett-Packard computers using COBOL, BASIC, IMAGE and QUERY on inventory and accounting applications.
In addition to a salary of up to £10,000, tax-free, all expenses will be met by the client.
Please send your CV to the address below. Letters will be forwarded direct, unopened, to our client. Any companies to whom you do not wish your application to be sent should be stated in a covering letter.
Interviews will be held by the client in mid-November, so all letters will be replied to promptly.
Ref. AH 56, Brunning Recruitment Advertising, Cedars Road, Maidenhead, Berks., SL6 1RZ

Brunning Recruitment Advertising
Cedars Road Maidenhead Berks SL6 1RZ

CLASSIFIED COPY
All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday. Ring Ian Carter for further details on 01-261 8016.

New ICL 2970 Installation
Operations

One of London's largest Boroughs is in the process of installing an ICL 2970, 2 megabyte computer. Vacancies now exist for Operations/Control staff to join our team. We run a two shift system, five people per shift. Each shift will be responsible for On-line Operations and Data Control.

Senior Operators
Ref. C/8/8762 to £5130 inc. S/A
With at least three years' experience on a large multi-programming machine, one year of which has been in a supervisory position. Duties will include training, working to pre-determined schedules, diagnosing hardware and software faults, liaising with engineering and user personnel and being fully conversant with Off-line Operations.

Senior Controllers
Ref. C/8/8763 to £5130 inc. S/A
With suitable experience of Data Control in a large machine environment, preferably including On-line Operating. Duties will include: being responsible for controlling all input data associated with processing, assembling and debatching data in accordance with pre-determined schedules, liaising with users, training all staff under him/her and being fully conversant with On-line Operations.

Operator/Controllers
Ref. C/8/8764 up to £4150 inc. S/A
With at least one year's experience in a large multi-programming environment, either on Data Control or On-line Operating. The successful applicant will carry out duties both On-line and Off-line using some of the most up-to-date equipment in a large go ahead installation.
We offer the usual excellent public service conditions, including 20 days holiday, a restaurant and good sports and social facilities.
If you are an ambitious person keen to develop your technical and personal skills, telephone 01-701 2870 anytime for an application form or write to:
THE PERSONNEL OFFICER, London Borough of Southwark, 27 Peckham Road, London SE5 8UB, quoting reference and job title.
Closing Date 16 November 1978.

Southwark

Commercial Analyst

(Company Car)

We have a vacancy in our head office in Cardiff for an experienced Commercial Analyst to assist in the development of systems on a new mini computer which has yet to be selected and to assist with the implementation of Bass Charrington's group systems.

Applicants should be educated to degree level and should have at least 5 years' data processing experience, preferably in a financial environment. A practical knowledge of management information systems is essential.

The position will involve some travelling to locations in Wales and the south west of England.

There are excellent opportunities for career development within the Bass Charrington group.

We offer a competitive salary, Company car, contributory Pension and Life Assurance Scheme, plus other benefits associated with a major company.

Computer Operations Manager

We wish to appoint an In-House Computer Manager at our head office in Cardiff, to run a new mini-computer installation which has yet to be selected.

Applicants should have a minimum of 5 'O' Levels including Mathematics and English Language and at least 5 years' experience in a large data processing department. The successful applicant will probably be currently employed as a Shift Leader and seeking an opportunity to move into management.

There are excellent opportunities for career development within the Bass Charrington group.

We offer a competitive salary, contributory Pension and Life Assurance Scheme and other benefits associated with a major national company.

Applications in writing, stating age, experience and present salary to:—

J. W. McCullough,
Personnel Manager,
BASS WALES & WEST LTD.,
Maes-y-Coed Road,
Llanishen,
Cardiff. CF4 4UW.

A member of the Bass Charrington Group

HOME ON THE RANGE!

No matter what range of computers you have experience in, we are pretty sure that we can help you find a job nearer home. You'll thank us for the extra leisure time and the savings on fares. Your car will probably be pleased too! Why not ring us or visit us for job opportunities in your area. Below are just a few of the jobs on offer.

Operations Engineers — A selection of great opportunities throughout the country. Excellent opportunities in mini field.

Programming

ASSEMBLER	Birmingham, Burton-on-Trent, Camberley, Chatham, Dagenham, Edgware, Epsom, E.C.2, Gravesend, Harlow, Horley, Leicester, Morden, S.W.1, Walton on Thames, Warrington, Whyteleafe, Witham, W.1
COBOL	Basildon, Birmingham, Braintree, Brentwood, Burton-on-Trent, Dagenham, Edgware, Epsom, E.7, E.C.1, E.C.2, E.C.4, Gravesend, Harlow, Hayes, Ipswich, Leicester, Letchworth, Morden, N.17, N.W.9, Romford, Staines, Stevenage, Sutton, S.W.1, S.W.9, Wembley, Whyteleaf.
PL1	Burton-on-Trent, Chatham, Chesham, City, Harmondsworth.
RPG 11	Crawley, E.C.2, E.C.3, Greenford, Hendon, Ipswich, Kingston, Wembley, W.1.

Analysis — Also vacancies for BASIC, FORTRAN, NEAT 3, PLAN, etc: Borehamwood, Colchester, Colnbrook, Crawley, Dagenham, E.C.1, E.C.3, E.C.4, Harrow, Ipswich, Kingston, Manchester, Romford, S.W.1, Sutton, Tottenham, Whyteleafe, Witham, W.1, W.C.2.

Sale — Top jobs for self-motivators.

Contract — Analysts and Programmers urgently required. All languages.

HITCH UP AND HEAD OUT OUR WAY! OR SIMPLY RING 839-4169

MARTON associates
FOR PROFESSIONAL PEOPLE AT THE CROSSROADS
Suite 628, Grand Buildings, Trafalgar Square, WC2
☎ 01-839 4169

HUGH SYMONS CAREERS
BUREAU MANAGEMENT OPPORTUNITY BRISTOL

Expanding group operating in the computer services industry for a number of years has a vacancy for

DEPUTY MANAGER

In its Bristol branch specialising in Data Preparation on magnetic tape and punch cards.

We need a person to share in the running of a busy, growing bureau with:

- ★ The ability to control female staff.
- ★ Good commercial experience preferably in data prep
- ★ Knowledge of Key to Disc operation.
- ★ Personality and appearance to deal with customers

A good salary circa £4,500 including annual bonus plus other benefits as available to the right person, together with relocation expenses.

MOVE TO A CAREER NOW

RING JOHN (MANAGEMENT SERVICES) on 0272 294196

SERVICE ENGINEERS
HAZELTINE LTD.

Due to continued expansion we now urgently require people from our Birmingham/Bristol/London areas and our Richmond workshop. To work on the successful Hazeltine computer terminal range. Salaries to £4,500 are being offered and these area positions carry a company car.

Telephone now or write to: Bryen Avis (Service Manager) Hazeltine Ltd., Terminal House, Petersham Road, Richmond, Surrey. Tel. 01-[illegible] 3111.

Contract Programmers/Analysts

If you are thinking of doing contract work why not start here by registering now for immediate and forthcoming requirements.

For further details contact Bridget Kotchie.

RENDECK LIMITED
100 New Bond Street
London W1Y 9LF
Tel. 01-629 5438

Rendeck

Servelec — PROGRAMMERS TO £5,500 SOUTH MANCHESTER

We are a vigorous Computer Systems house involved in micro/minicomputer based automation/control Systems. The successful candidates will work on a variety of applications, and will enjoy satisfying career paths with all the usual company benefits. Call or write John Archer, SERVELEC COMPUTER SYSTEMS LTD., Churchill House, Tribal Road, Old Trafford, Manchester M16 0PO. Telephone (061) 872 0656

OPERATORS

(BLOCK CAPITALS PLEASE)

Complete the coupon and return to the address below; for your next PERMANENT or CONTRACT job.

Name (in full) ....

Address (Permanent) ....

Telephone Home .... Office ....

Type of Transport .... Date of Birth ....

Current Position (Contract · Permanent: delete) .... Salary/Rate ....

Position Required (Contract · Permanent: delete) .... Salary/Rate ....

Notice Required/Date Available (delete) ....

Areas Preferred: First Choice .... Second Choice ....

Experience to date: (Last Position First)

Company Name and Location	From Mth/Year	To Mth/Year	Hardware	Operating Systems/Software

Date .... Signature ....

EFFECTIA GRAVIS
NATIONAL HOUSE, 60 WARDOUR STREET, LONDON W1V 3HP. 01-439 6481 (24 hours)

REG. No. DATE
CW2 2/11/78

2900 Opportunities in London E15

We have an ambitious development plan, which commits us to providing database and increased communications facilities to all departments within the next 5 years. To help us achieve this a 2 megabyte 2980 running under VME/B will be delivered in June 1979 to replace our present 1902T which runs under George 2. We have recently restructured and expanded our Computer Services Division and are therefore looking for additional staff at all levels of experience. Current vacancies are listed below.

Applications Development

Applications Development Manager — at least £7329
Applicants should have considerable experience in the development of major applications with proven success in project management.

Applications Team Managers — at least £6798
Applicants should have considerable experience in the development of major applications together with management experience.

Applications Analysts — at least £6012
Applicants should have experience in producing system specification for major applications.

Applications Designer/Programmers — up to £5517
Salary dependent on experience. We have vacancies for experienced programmers at all levels.

Technical Support

System Support Manager — at least £6798
Applicants should have considerable experience of the technical support function including at least a year at team leader level.

System Support Analysts — at least £6012
Applicants should be senior programmers with experience of supporting a large operating system, software utilities and packages.

Support Analyst/Programmer — up to £5517
Salary dependent on experience. Applicants should have at least 2 years programming experience including a working knowledge of George 2.

Operations

Assistant Operations Manager — at least £5617
Applicants should have considerable operating experience using a large operating system together with some experience of general operations management.

Operations Team Leader (Day Shift) — at least £5066 + shift allowance
At least three years 1900 or 2900 operations experience including some supervisory experience.

If you would like to know more, just telephone 278 6783 extension 33 (24 hours) or write to the Head of Computer Services, London Borough of Newham, at The Grove, London E15 1EW, and we will send you a prospectus giving details of our organisation and the post or posts in which you are interested.

LONDON BOROUGH OF NEWHAM

Computer Operator
Research

The Information and Computing Sciences Division of Shell Research Limited, Sittingbourne plays an increasingly important role in support of the search for new agricultural chemicals. To fulfil that role, the Division is looking for a Computer Operator to join a small group operating the Company's Univac 9300 and DEC PDP – 11/40 computers on a shift basis. In addition the opportunity exists for programming for which you will receive training. Preferably you should have some experience with computers but if you have a mathematical/statistical 'bent', can show initiative, and work with a minimum of supervision we are willing to consider you. It is anticipated that current studies into computing on site will result in substantial new computing capacity.

We offer a competitive salary, membership of the Shell Contributory Pension Fund, as well as the opportunity to make use of a good staff restaurant and sporting facilities including squash courts and indoor swimming pool. Please write in detail concerning your technical ability and experience, or telephone for an application form to:

Mrs. M. J. Hunt, Personnel Division, Shell Research Limited, Sittingbourne Research Centre (c6), Sittingbourne, Kent ME9 8AG. Telephone: Sittingbourne 24444, extension 203.

Shell

Move into D.P. Training

3M, a major international organisation, wish to recruit a Training Officer to expand its Data Processing training function.

You will report to the Manager, D.P. Education and Training, and will be involved in the full range of training activities. This position offers an opportunity to devise and implement training modules and to assist in all aspects of D.P. staff development — with subsequent real opportunity to progress into other fields of D.P.

Aged 21+, you should, ideally, be of graduate level, with at least 2 years' experience in systems analysis and programming and should have knowledge of a computer language. Some experience of instruction would be an advantage, although full training in instructional techniques and D.P. training co-ordination will be provided if required.

The company offers a competitive salary and excellent large company employee benefits.

Please write with brief personal and career details to, Miss D. Archer, Personnel Officer, 3M United Kingdom Limited, 3M House, P.O. Box 1, Bracknell, Berkshire RG12 1JU.

3M

INSTITUTE OF GEOLOGICAL SCIENCES
DATA ANALYST

The Institute has a vacancy for a Data Analyst in the Geomagnetism Unit in Edinburgh. Duties will involve the processing of machine-readable, analogue and numerical geomagnetic data from regional arrays, surveys and the global network of permanent observatories; assisting in archiving and retrieving these data and in analysis and interpretation; and the development of computer programmes.

QUALIFICATIONS AND AGE

Applicants should normally be under 30 and have a degree or equivalent, preferably in Computer Science. A knowledge of Fortran and experience in handling machine-readable data would be an advantage. Appointment will be at Scientific Officer or Higher Scientific Officer level depending on qualifications and experience.

SALARY

Scientific Officer	£2839-£4415
Higher Scientific Officer	£4101-£5448

Starting salaries may be above the minimum. Non-contributory pension scheme. The staff of Council are not Civil Servants but their pay and conditions of service are similar to those of scientists in the Civil Service.

For an application form, to be returned by 20th November, 1978, write to Recruitment Section, Institute of Geological Sciences, Exhibition Road, London SW7 2DE.

Please quote reference SO/GM/78/1.

NATURAL ENVIRONMENT RESEARCH COUNCIL

City of Salford
COMPUTER CENTRE

CHIEF SYSTEMS/PROGRAMMER

Grade P.O.2 £6060-£6702 p.a. including supplement

The Computer Centre provides data processing services to all departments of the City Council using an ICL 1900 series computer. A vacancy has arisen in this key position in the Systems Development Division.

The Chief System Programmer reports to the Systems Development Manager and is responsible for the supervision, co-ordination and quality of work performed by a section of 10 people who comprise the Systems Design and Programming Section and for the supervision of a section of four systems analysts. The systems design and programming section produces computer systems from specifications of requirements provided by systems analysts, undertakes improvements to existing systems and provides software support for the Computer Operations Division. The duties of the post include participation in the management of the systems development division and in the forward planning of data processing activity.

Applicants must possess a sound knowledge of ICL 1900 series software, a demonstrable management ability and sound experience in systems design and programming techniques and methods. Knowledge of TP processing requirements and more recently available ICL equipment than the 1900 series would be a distinct advantage.

Post Reference. 1822/CW.

The post is permanent, superannuable and subject to the satisfactory completion of a medical questionnaire. Commencing salary will reflect experience and qualifications. Please write or telephone 061-793 3158 for an application form quoting post reference number to the Personnel Manager, Salford Civic Centre, Swinton M27 2SN, to whom they should be returned by 17th November, 1978.

Datasolve Datasolve Datasolve Datasolve

We've made things easy for you!

If you're chasing a new job or a new contract, save time by filling in your application form here and now.

Personal Please write in ballpoint, using block capitals.

Surname .... Forenames ....

Address ....

Tel. Home .... Office (discretion will be used) ....

Age .... Place of Birth .... Car? ....

Are you prepared to relocate? .... UK/Abroad (delete)

Experience Place no. of yrs. in box, e.g. IBM 360/370 ... [4]

Machines: Please specify model.		Applications	
IBM 360/370		Commercial	
IBM others (specify)		Financial	
ICL 1900/2900		Payroll	
ICL others (specify)		Production control	
Honeywell		Stock control	
Univac		Scientific	
Burroughs		Realtime	
PDP		Software	
Other mainframes (specify)		Database	
		Message switching	
		Communications	
Other mini-computers (specify)		Data transmission	
		Central process	
		Teleprocessing	

Languages			
Cobol		MIS*/CPA*/PERT*	
Plan		Magnetic tape	
Assembler		Disk	
PL/1		Others (specify)	
Fortran			
Filetab		**Job Titles**	
RPG II		Project leader	
Auto*/easy*/user code*		Systems analyst	
Others (specify)		Systems engineer	

Operating Systems			
		Analyst/programmer	
DOS		Systems programmer	
OS		Programmer	
George (specify)		Operations supervisor	
CICS*/HASP*/GRASP*		Operator	
DBOMP*/MVT*/IMS*/CMS*		Consultant	
Others (specify)		Sales representative	
		Others (specify)	

*Delete where inapplicable

Position sought Please state briefly the type of appointment you are seeking.

Minimum salary £ .... Notice required/Date available ....

Signed .... Date ....

Cut out the whole advertisement and post to the address below.

Knight

Knight Computer Services Limited

Staff Services Division of BOC Datasolve Group and a member of Computing Services Association.

Knight Computer Services Limited, 14 Old Park Lane, London W1Y 4NL.

01-491 4706

24-hour answer phone

KNIGHT IS RIGHT FOR RECRUITMENT 01-491 4706

Knight

Lothian
REGIONAL COUNCIL

NAPIER COLLEGE OF COMMERCE AND TECHNOLOGY

COMPUTER UNIT

Napier College has a major commitment to education in computing and data processing and a separate Computer Unit to provide a service to students and staff has been created. The unit is split between the two major sites of the College.

At Merchiston the unit operates a CTL Modular One Computer and at Sighthill an ICL 1902 Computer and staff may be required to work at either site.

Applications are invited for the following newly created vacancies.

1. CHIEF PROGRAMMER/ANALYST

The person to be appointed will be responsible to the Director of the Unit for,

a) the implementation and maintenance of operating Software

and b) the analysis and programming duties associated with the development of applications programmes.

This is a Senior position and preference may be given to a candidate with a commercial background in Computing. In the absence of the Director the Chief Programmer/Analyst will assume responsibility for the Unit.

Salary is in accordance with Scale AP IV/V

2. COMPUTER OPERATIONS SUPERVISOR

It is anticipated that the successful candidate will have had a minimum of three years' responsible experience of both batch and interactive modes of computing.

The Computer Operations Supervisor will be responsible to the Director of the unit for all operating staff and the daily operating schedule for the installations.

Salary is in accordance with Scales APIII/IV

3. SENIOR PROGRAMMER

An experienced programmer is required with a knowledge of Systems Software implementation and applications program development. Preferences may be given to candidates with experience of ICL or CTL computers.

The person appointed will be responsible to the Chief Programmer.

Salary is in accordance with Scale APIII

4. SENIOR COMPUTER OPERATORS

Two experienced operators are required, one for each of the units two Computers.

The person appointed will be responsible to the Computer Operations Supervisor for the day-to-day operations including supervision of operating and data preparation.

Experience in operating using batch and interactive modes or with ICL packages is desirable.

Salary is in accordance with the Scale for Higher Clerical Grade.

The following Salary Scales are applicable

APIII	£4368 - £4773
APIV	£4920 - £6404
APV	£5668 - £6066
Higher Clerical	£3279 - £3561

APPLICATION FORMS FROM

THE ACADEMIC REGISTRAR
Napier College of Commerce and Technology
Colinton Road
Edinburgh
EH10 5DT

Contract Programmers/Analysts

If you are thinking of doing contract work why not start here by registering now for immediate and forthcoming requirements.

For further details contact:
Bridget Kotchie

RENDECK LTD.
100 New Bond Street
London W1. Tel: 01-629 5438

Rendeck

RPG11 — up to £6,000
In Baker Street, W.1

Training given in on-line techniques and system design to programmers with key entry ability. Friendly office with free food and flexible hours in entertainment and shopping area.

Ring: 01-487 4413

COMPUTER RECRUITMENT DIVISION

SYSTEMS & PROGRAMMING

BAL & PL1 PROGRAMMERS £4800-£7200+
A prestige City institution offers challenging career prospects in a dynamic environment. Perks include flexi hours and a subsidised canteen.

MINI SPECIALISTS £3500-£7000
If you're a Mini Programmer involved in Technical or Commercial applications with experience of Mini Assembler, BASIC + RSTS or CORAL 66 then call for details.

IBM DOS/OS COBOL PROGRAMMERS £4000-£6500
Outstanding career prospects await Programmers with one year+ experience in London, Surrey, Herts and Middlesex. Opportunities include training in DATABASE. Perks include a CHEAP MORTGAGE.

RPG II PROGRAMMERS £4500-£5750
A fantastic opportunity ... world wide financial concern retaining IBM SYS 3-12, SYS 32. Exciting ... potential and a CHEAP MORTGAGE.

INTERVIEWER/PROGRAMMERS £7000-£10000
Unlimited potential is ... Recruitment Consultants with a background in Systems and Programming in the Staffscene organisation. It's a fast moving environment offering solid ... progression to the right people.

FORTRAN PROGRAMMERS £4000-£7000
If you have mainframe ... experience coupled with a background in either TYPESETTING, TECHNICAL SUPPORT, OPS RESEARCH, ENGINEERING, PETROCHEMICALS or FINANCE ... call now for further details.

OPERATORS

IBM 360/40: TWO OPERATORS £4000+

ICL 1900 OPERATORS: GII to £4500

IBM 370/158: TWO OPERATORS c £5000+

NCR CENTURY OPS: READY FOR CRITERION? £4500+

PDP 11/70 OPERATOR £4100

HONEYWELL 60/66 or H1200 OPS £4000+

STAFFSCENE
9 ST. BRIDE STREET
LUDGATE CIRCUS
LONDON EC4

24 hrs. answering service
01-353 6931

HERTFORDSHIRE COUNTY COUNCIL
HIGHWAYS DEPARTMENT

ANALYST/PROGRAMMER

SALARY £5,847 to £6,822

GRADE PO1 (O/E)
POST NO. AE12

THE JOB

We offer you the opportunity to support and develop a variety of information systems providing essential data for the engineers and management of the Highways Department.
You will join a small team under the direction of a Senior Analyst and participate in the design and implementation of new systems and the support of existing ones.
Applications which the team are presently responsible for are Traffic Accident Analysis, Traffic Counter Analysis, Structural Assessment, Road Inventory and Road Treatment records.
The present County Council computer is being replaced by the latest NCR Criterion Mainframe, a 1M byte 8680 with large discs, fast tapes and terminals. The new computer will offer virtual storage and interactive programming facilities. The team also use a database package accessed via terminals at a time sharing bureau.

THE PERSON

You should have a degree in Civil Engineering Mathematics or Computer Science and experience in technical or informations systems work, with a background of COBOL and FORTRAN.

THE OFFICES

You will be working with a group of young people in a large country mansion within its own grounds.
For further information and application forms please telephone Hertford 54242, extension 8023 or write to Alison Taylor, Gnidlings, North Road, Hertford.
Closing date 20th November, 1978.

---

ata Computer Recruitment

A division of ATA Selection and Management Services, recruitment consultants to Industry and Commerce since 1962

OPERATIONS SUPERVISOR
TO £4,000

OPERATOR
TO £3,000

CENTRAL EDINBURGH

Our client, a leading legal partnership, wish to recruit an Operations Supervisor and an Operator for their Philips P410 installation in Central Edinburgh.

The Operations Supervisor will work normal office hours and perform a dual role as Senior Operator/Supervisor. The ideal applicant will have experience in operating small business computers/VDUs although serious consideration will be given to anyone with experience of operating larger systems.

The Operator will work flexitime and again preference will be given to applicants with experience of small business computers/VDUs, however, candidates with relevant operating experience will also be considered.

The salaries are negotiable around £4,000 and £3,000 respectively and carry the normal fringe benefits.

For an immediate interview telephone Ron McDonald.

ANALYST/PROGRAMMER

350 miles from London

Our clients, C. H. Dexter Ltd. are world leaders in the development and manufacture of highly specialised non-woven products. They are situated in the picturesque Scottish Borders approximately 9 miles from Berwick upon Tweed.

They wish to recruit an Analyst/Programmer to adopt responsibility for a challenging variety of applications in both commercial and production control areas, including involvement in ... and enhanced teleprocessing systems.

The ideal applicant will have a degree or professional qualification, 2 years' plus experience of systems analysis and a sound working knowledge of RPG II.

The salary offered is negotiable around £5,000 plus participation in a quarterly-profit share scheme, free life assurance, contributory pension scheme. Generous relocation assistance is available where necessary.

For further information telephone Harry Clark.

WANTED!

Six Computer Sales Executives (Scotland)

We have a number of clients wishing to recruit sales executives with experience of large systems, small business computers, terminals, scientific and technical desk-tops.

The salaries offered range from £5K to £9K basic with an on-target performance ... £11K to £20K.

It must be worth a phone call to Harry Clark.

031-226 5381. ATA COMPUTER RECRUITMENT
ANGLIA HOUSE, 26 FREDERICK STREET, EDINBURGH EH2 2JR

9/11 ACCOUNTANCY & COMPUTER PERSONNEL

IBM 370/158 OSVS VICTORIA	£4,200+
IBM 370/138 DOSVS POWER VICTORIA	£4,000
ICL 2903 EXEC I ILFORD	£3,800
IBM 360/50 DOS GRASP WEST END	£3,800
IBM 370/125 DOSVS POWER VS NORTH LONDON	£3,590
IBM 360/148 DOS VS STRATFORD	£3,500+

Ring: CAROLINE ON 638 9841 NOW!!
80 Bishopsgate, EC2

AMERICAN EXPRESS INTERNATIONAL BANKING GROUP

SYSTEMS DEVELOPMENT GROUP

MINI-COMPUTER PROGRAMMERS

The U.K. Banking Group's Computer Systems Development Programme now requires mini-computer programmers to work on sophisticated real-time TP Systems. The Group is based at our Moorgate Offices using High Level Languages on Honeywell Level 6/43 Mini-Computers.

Previous experience on this machine is not necessary as training will be provided.

We seek candidates who are of Senior programmer potential who would like to join a small but expanding team.

Salary level: Circa £6,000. Plus all the fringe benefits normally associated with an International Bank.

Please apply in writing stating age and experience to:

A. J. Reynolds
Deputy Personnel Manager, UK Region
American Express I.B.C.
c/o 120 Moorgate, London EC2P 2JY

SOFTWARE DEVELOPMENT STAFF

Bucks./Holland — to £15,000 (Holland)

Owing to planned expansion at all levels vacancies have arisen for Software Staff in a software/development role. Successful candidates will have had about 2 years' IBM assembler experience and some knowledge of DOS or DOS/VS ...

Ref. 1/44

ANALYSTS

C. London — to £7,500

Mainframe and Mini, with a minimum of 4 years' experience in D.P. with at least 1 year in systems analysis. In addition, Mini Analysts should have 2 years' experience in designing systems for Minis and some background in Real-time ...

Ref. 2/44

HAVEN HAVEN HAVEN HAVEN

PROGRAMMERS

Herts — to £5,500+

Ref. 3/44

SYSTEMS ANALYSTS/PROGRAMMERS

to £12,000+

Ref. 4/44

HAVEN HAVEN HAVEN HAVEN

HARDWARE ENGINEERS

Middle East — to £11,000 TAX FREE

A number of interesting assignments with excellent opportunities have arisen for engineers with in-depth experience of preferably mini-systems maintenance/development.

Preference will be shown to those with a degree or professional qualification. One year renewable contracts ... the Middle East.

Ref. 5/44

IBM SYSTEMS PROGRAMMERS

London, Europe, Middle East — to £8,000 (U.K.)

Informatix has been retained by a variety of organisations in the Consultancy and ...

Ref. 6/44

HAVEN HAVEN HAVEN HAVEN

ANALYSTS/PROGRAMMERS

Holland — to £14,000

Openings for all levels of D.P. professionals within this highly regarded technical consultancy specialising in on-line, real-time message switching and network applications using Minis and Microprocessors.

Assembler level programming experience is of primary importance and ideally candidates should have a degree in Computer Science or related areas.

Candidates will be expected to demonstrate enthusiasm towards the prospect of settling in Holland for an extended period. All removal expenses, initial accommodation, etc., will be met in full by our clients. Interviews will be held in London as soon as possible and offers will be made to successful applicants no later than end November.

Ref: 7/44

INFORMATIX UNITED KINGDOM AND OVERSEAS INDEX

Haven Informatix Limited

24 Grays Inn Road London WC1X 8HR Telephone 01-831 6055 Telex 299539 HAVEN G

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

FUTURE DPM

CLOSE TO END OF M1 **c £6,500**
2+ YEARS COBOL

This is an excellent opportunity for a person with a sound COBOL programming background who now feels capable of assuming full responsibility for formulating and developing new commercial systems and undertaking total charge of our client's installation.

The company, supported by a large American conglomarate, are well known and respected in the audio and computer peripheral sectors of industry. They have recently installed an ICL 2903 and now require an experienced programmer to implement a complete range of new systems.

The successful applicant, ideally with two or more years' programming experience in a financial environment, will be encouraged to develop an all round analytical and programming expertise and can look forward to promotion to DATA PROCESSING MANAGER where excellent opportunities are available.

The company offers four weeks' holiday, pension and life assurance schemes with a subsidised restaurant and excellent career prospects.

Ref. N2/211

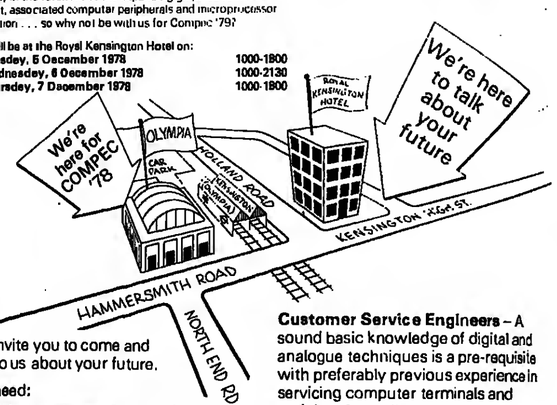
24-hour answering service
Please telephone for a confidential discussion or write to:
30 Fleet Street, London EC4Y 1AA
01-353 0981

Join us for Compec'79

If you're going to Compec this year, you will see that Tektronix is firmly in the forefront of the expanding graphics terminal market, associated computer peripherals and microprocessor emulation . . . so why not be with us for Compec '79?

We will be at the Royal Kensington Hotel on:

Tuesday, 5 December 1978	1000-1800
Wednesday, 6 December 1978	1000-2130
Thursday, 7 December 1978	1000-1800



We invite you to come and talk to us about your future.

We need:

Sales Executives – 3-4 years' experience preferably in computer sales and a degree in engineering, mathematics or computer sciences.

Product Support Engineers – – Communicative engineers with a degree/HNC in electronic engineering, familiar with digital/analogue techniques and design experience in data communications.

Systems Analysts – At least five years' post-graduate experience on a wide variety of main-frames, operating systems or communication software, your analytical, incisive mind and an interest in varied customer problems is what we're looking for.

Customer Service Engineers – A sound basic knowledge of digital and analogue techniques is a pre-requisite with preferably previous experience in servicing computer terminals and peripherals on site.

We offer:

Above average salaries, non-contributory pension and life assurance scheme, and other big company benefits. We also, of course, ensure that all the necessary sales or product training is given at our well-equipped training centre in Amsterdam.

Don't forget – the Royal Kensington Hotel, Tuesday, Wednesday, Thursday, 5-7 December, all day. But if you can't make it, write to or phone Jim Rockall at Tektronix UK Ltd, Coldharbour Lane, Harpenden, Herts (Harpenden 63141) for an application form and information package.

Tektronix
COMMITTED TO EXCELLENCE

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

CAREER PROGRESSION PROGRAMMERS & ANALYST/ PROGRAMMERS

BEDS. **c £5,500**

The decision to change environment, whether in a new job or new location, is not one to be taken lightly. Assurance of an exciting and technically stimulating challenge can often alleviate doubts and confirm your future plans.
Our client, a division of a major British company, can offer these incentives due to their commitment to embark on a complete range of commercial systems. In order to support these plans, the company is now looking to recruit additional professionals to become actively involved at the initial stages of projects and see them through to successful implementation.
Career minded PROGRAMMERS and ANALYST/PROGRAMMERS, who possess a minimum one year's experience in either COBOL or ASSEMBLER and who are familiar with IBM 370 utilities, can look forward to an outstanding career path.
Apart from attractive salaries and prospects, the company also offer very favourable relocation expenses and other fringe benefits.

Ref. N1/211

PROGRAMMERS

SLOUGH **To £5,000**

Our client, a busy engineering company, is currently developing several on-line real-time applications.
If your would like:
* To receive training in advanced IBM software.
* Develop COBOL programs involving database and TP systems.
* Work on a variety of applications projects.
* Five weeks' holiday a year.
* Excellent starting salary and conditions of employment.
* To join an active sports and social club.

—and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career.

Ref. E1/211

ANALYSTS & PROGRAMMERS

CROYDON **£7,000-£10,000**

If your current position can offer you development work in challenging areas of computerisation; excellent job prospects; together with a salary in the band quoted above you will probably not need to read further.
If however you do not have, but would like, this type of package you need to know more about the jobs on offer at our client's offices in Croydon.
We are recruiting both Analysts and Programmers for projects commencing in the early part of the New Year. Applicants should have a good general D.P. background and the potential to progress in a demanding environment.
The computer department is housed in modern offices in Central Croydon easily commutable for Kent, Sussex and S.E. London.

Ref. SE1/211

SENIOR ANALYSTS
CICS/IMS SYSTEMS

THE CITY **To £7,500 + BENEFITS**

Senior personnel are required to define systems for a large IBM installation utilising both IMS and CICS. Projects cover a wide variety of applications and the company can boast of a very successful record in activities typical of the City. Candidates should have at least two years' proven analysis experience with particular emphasis on a methodical approach to system/program specifications and testing procedures. The more senior applicants will possess on-line or database experience coupled with a programming background.
Career opportunities are excellent as the date processing department is seeking to expand the hardware configuration to keep pace with the demand for D.P. systems. First-class starting salaries are further enhanced by an annual bonus and modern working conditions.

Ref. S1/211

24-hour answering service
Please telephone for a confidential discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 0981

APL Analyst/ Programmer

Rank Xerox (UK) are looking for an Analyst/Programmer – preferably with APL experience to join the Timesharing Applications unit within the O.R. Group situated at Bridge House, Uxbridge.
The work involves development of major APL applications and providing full support to internal users.
We are interested in meeting people with either APL experience or with some Fortran or equivalent scientific programming experience backed up by proven mathematical ability and good communication skills, in view of the amount of internal liaison involved.
Salary level will vary according to age and experience but will be competitive and offered in conjunction with an attractive range of benefits and exceptional career prospects within a highly successful international organisation.
For further details please contact Denise Lincoln, Rank Xerox (UK) Ltd, Bridge House, Oxford Road, Uxbridge, Middlesex.
Telephone: Uxbridge 51133.

RANK XEROX

UNIVAC 1100 **ASSEMBLER PROGRAMMERS**
UNIVAC 1100 **COBOL PROGRAMMERS**
NCR 8250 **COBOL PROGRAMMERS**
IBM OS **COBOL PROGRAMMERS**
IMS **SYSTEMS ANALYSTS**
ICL 1900 GIII **COBOL PROGRAMMERS**
DEC PDP 11/40 **DEC SASIC PLUS OR**
FILE TAB EXPERIENCE

Telephone or send details to
STONE COMPUTER SERVICES, FREEPOST, WIRRALL, MERSEYSIDE L63 3AB. TEL. NO. 051-608 9361

UNIVERSITY OF NEWCASTLE-UPON-TYNE
NORTHUMBRIAN UNIVERSITIES MULTIPLE ACCESS COMPUTER

PROGRAMMING ADVISER

Applications are invited from graduates to join one of the groups within the NUMAC computing service concerned with advising, teaching and providing documentation on the use of computer programs. Users of the service come from many different universities and cover a wide range of academic discipline. The areas where expertise is currently needed are graphics, scientific applications and survey and statistical analysis. Applicants should have an understanding and sympathy with both research workers and students, and a desire to extend the knowledge and use of computers. The Computing Laboratory has excellent facilities including powerful IBM hardware with interactive capability and a large repertoire of library programs.

The appointment will be made on one of the following scales according to age, qualifications and experience: Range 1A £3,853-£6,555 per annum. Range II £6,080-£7,754 per annum. Membership of the superannuation University superannuation scheme will be required.

Further particulars may be obtained from the Registrar, The University, 6 Kensington Terrace, Newcastle-upon-Tyne NE1 7RU, with whom applications (three copies), together with the names and addresses of three referees, should be lodged not later than 18th November, 1978. Please quote reference OV.

Freelance Programmers

Our client has IBM 370 Mainframes and will pay attractive rates for programmers with a minimum of four years' programming experience, at least two of which is on IBM 360/370 equipment using COBOL under DOS or DOS/VS.

If you have the relevant experience and would be interested in a long term contract in the Northern Home Counties area then contact us.

Please write with full details. These will be forwarded direct to our client. List separately any companies to whom your application should not be sent. Ref. FY.1077.

These appointments are open to men and women.

ASL CONFIDENTIAL RECRUITMENT 17 STRATTON STREET LONDON W1X 6DB
A member of MSL Group International

ata Computer Recruitment
A division of ATA Selection and Management Services, recruitment consultants to industry and commerce since 1962.

ANALYST PROGRAMMER

c£5,600 + Generous Expenses
CHESHIRE

Our clients require an Analyst Programmer with approximately three years' experience of the analysis of business problems and providing a computer based solution.
He/she will be actively employed in Management Control Information Systems and in-depth knowledge of IBM Systems, particularly S32, and RPG II are essential.
The successful applicant's first assignment will be to identify requirements, specify systems, write program specifications and be responsible for the installation of a S32 at a subsidiary company and the subsequent user training.
Thereafter, he/she will operate within the group in a "consultancy role" specifying systems and/or Hardware.
As a direct result of the nature of our client's activities, there will be a high level of travel within the UK to the various offices and to subsidiary companies. It is also probable that the occasional visits to associate companies on the Continent will be necessary.
Salary increases consist of two elements, a cost of living increase and a merit reward which is directly related to the degree of effort and success achieved by the individual.
GENEROUS RE-LOCATION ASSISTANCE IS AVAILABLE consisting of Estate Agent's fees, all legal fees and physical removal costs.
For further details telephone 081-832 5856 or write enclosing curriculum vitae to:

ATA COMPUTER RECRUITMENT
ANGLIA HOUSE, 86 CROSS STREET, MANCHESTER M2 4LA

LONDON (01) 637 0781 MANCHESTER (061) 832 5856 BIRMINGHAM (021) 643 1994
BRISTOL (0272) 211035 EDINBURGH (031) 226 5381 CRAWLEY (0293) 514071

CHARING CROSS HOSPITAL MEDICAL SCHOOL
(University of London)

MACHINE OPERATOR

required to work in Computer Unit.

Duties will include data preperation and assisting with computer operation.

All necessary training will be given.

Good social and recreation facilities on site.

Salary according to age and experience on scale £1,881-£2,619 plus £450 per annum London Allowance.

Applications for forms obtainable from The Secretary, Charing Cross Hospital Medical School, The Reynolds Building, St. Dunstan's Road, London W6 8RP. (Ref: 424/5).

UNIVERSITY OF SURREY COMPUTING UNIT

SENIOR COMPUTER OPERATOR

(Deputy Shift Leader)
Up To £4839

FOUR WEEKS' LEAVE

We need a Computer Operator who has had at least two years' experience and is now looking for a position with greater responsibility and wider variety. Actual experience on specific computers is less important than the personal qualities of adaptability and initiative. We already have several different computers, and new machines are expected to be commissioned next year.

There are three shifts from Monday to Friday. Excellent sports and social facilities. Very pleasant surroundings on University campus.

For further details, or to arrange an informal visit to the Computing Unit, please telephone Mr. P.E. Simmonds (Operations Controller) on Guildford 71281 ext. 227.

For an application form, write to the Staff Officer, University of Surrey, Guildford, Surrey GU2 5XH, or telephone Guildford (0281) ext. 482.

West Yorkshire Metropolitan County Council
Traffic Unit

Section Engineer

— Post Ref. TF78 017

POTA £6,727-£8,342 inclusive of supplement

To lead a small team undertaking the planning, design and implementation of various parts of the UTC signal network in the county, initially primarily in Bradford, and such other traffic signal work as is necessary. The post is based in Leeds.

Sound background in traffic engineering essential, particularly in the field of Control Systems and Traffic Signals, together with experience in Transyt. Professional qualification in relevant discipline required.

Application forms may be obtained from Directorate of Planning, Engineering and Transportation, Room 238, County Hall, Wakefield and should be returned not later than 13th November, 1978.

SYSTEMS PROGRAMMER

£7,500 p.a.

You should have a good background in DOS/VS, have worked with operating systems for at least 18 months, and preferably you will have knowledge of ASSEMBLER, CICS, GRASP and/or POWER. Experience of TP/Database systems would also be advantageous, though not essential.

This is an opportunity to join a small yet progressive organisation. You should be prepared to travel to client locations around London or beyond. A mileage allowance will be paid, and any other travel costs reimbursed.

Applications will be treated in the strictest confidence.

In the first instance apply to Barrie Holland, X-Calibur, 47 Essex Street, WC2R 3JF. Telephone 01-353 8201. Please quote reference No. 320.

Computing Services Association Agency Licence SE(A) 3346

X·Calibur
CONTRACT SERVICES

Analyst/ Programmers

Cobol/Assembler

Could you develop and set up systems on a mini or micro computer?

West of London/M4 ten miutes c£5250 to start

Our client, a major British group with a unique record at home and in exports, plans to develop warehouse information and point of sale systems utilising mini and micro computers in various locations in the UK. The plan includes the linking of some of these minis to the group's central mainframe in the West Country as appropriate.

The successful candidates will be involved in developing systems and programs, initially as part of a small team, on mini computers, working closely with user staff, and using high and low level languages. Later on, as their knowledge and expertise in mini computing increases, they will become the key people in mini and micro computer systems development, and will project manage wide ranging developments of mini computer processing in the group.

You are an Analyst/Programmer, or a Programmer, with 1½ to 2 years experience in programming in COBOL or Assembler, or both, and keen to move now into a ground floor opportunity in a mini computer systems environment. You have accepted that by the mid 1980's, mini and micro computers, large and small, distributed or otherwise, will contain the bulk of data processing systems development in many companies. You want to move over, and establish yourself now, rather than get trampled on in the last minute rush. If you are already into mini computers then it could be so much the better for your application.

The client is able to offer very good starting salaries together with unique benefits and opportunities and, a substantial relocation package and bridging loan where appropriate. Full training will be provided as appropriate, including systems analysis and design, systems management, distributed processing, real time processing, etc.

Please write a brief ONE PAGE list of name, address, age, home and office telephone number, programs written to date, machines and software involved, present position and salary, and send it immediately to ANTHONY SPURR, Management Recruitment Division, quoting CO/1, at the address below. Please list on the reverse side those companies you would not wish to be considered for.

These appointments are open to either sex.

BIS Applied Systems Limited
York House, 199 Westminster Bridge Road
London SE1 7UT
Telephone 01-633 0866

BIS Applied Systems

We want to shake the living daylights out of our ICL system software

At Sainsbury's, we're making the transition from 2 heavily loaded 1904s to 2 2970s, soon to be configured as a multi-processor. The new installation will handle on-line transmission to 12 depots and other plans for the immediate future include the setting up of a database.

We've a couple of systems running on the 2970s already, with many more applications to add on as soon as possible.

But before we get any further, we need a man or woman who can test our system software to the point of destruction. And if it passes that test, to build it into a complete, customised operating system that will do anything users demand of it.

It's much more than just a routine performance monitoring job. By talking to our analysts and programmers, you'd determine what facilities they need. Then, using all your extensive technical knowledge, you'd make sure that the system software is equipped to provide them.

The main qualification you'll need is a real understanding of operating systems — particularly George III — on a conceptual as well as a technical level. 2900 experience is an obvious advantage — and one that would be reflected in your salary. You'll also need to be as good with people as with technicalities of operating systems, because the rapport you establish with users will have a big influence on your success.

For the outstanding candidate a starting salary of up to £6,000 p.a. plus all the benefits of a company of the size and stature of Sainsbury's. But what will interest you just as much is the chance to use all your systems software experience — and gain more — on one of the largest and most advanced 2900 installations in the country.

Ring Lorraine Cathersides on 01-921 6047 for further details.

J. Sainsbury Ltd., Stamford House, Stamford Street, London SE1 9LL

SAINSBURY'S set the standard

SECTION HEAD-DEVELOPMENT

HARROGATE (c £8,000)

An experienced computer professional is required by the North Eastern Region of the Central Electricity Generating Board to lead one of two sections engaged in the development of computing systems.

The Section is involved in:

- Implementing, Designing and Installing Computing Systems
- Providing advice on Computing
- Maintaining and developing computing procedures and standards.

The person appointed will, in addition to the recruitment, training and supervision of the section's staff, be directly involved in development work as a leader of major projects and in the formulation of computer Branch Plans.

As a senior member of the Branch, the Section Head will be expected to make a substantial contribution to the development of computing within the Region.

The Computing Service currently provided to the Region is based on:

- An ICL 1904S under George III running batch, MOP and a small amount of T.P. work.
- Use of a twin IBM 370/168 installation at C.E.G.B., at H.O. in London

Various mini-computers are used at Power Stations.

In order to improve the service, provide a base for further development and to satisfy the growing requirement for TP application, the 1906S will be replaced by a 2960 early in 1980. Proposed applications include Materials Control/Purchasing, Costing and Budgeting, Work Control and Scheduling, Plant Performance analysis and other engineering and commercial systems.

The development of Distributed Computing is being actively considered as the means of satisfying a growing requirement for general purpose computing facilities at Power Stations and other major management units.

Applicants should have a degree or professional qualification, together with several years experience in implementing data processing systems, and should be able to demonstrate up-to-date knowledge of developments in Computing. Evidence of supervisory experience is essential.

The salary will be within the range of £7,146 p.a. – £9,311 p.a. point of entry dependent upon age and experience.

Applications should be on standard application forms obtainable by telephoning Recruitment Section (Harrogate 702633/4) and should be returned to the Regional Personnel Manager, C.E.G.B., Beckwith Knowle, Otley Road, Harrogate, HG3 1PS, to arrive not later than **Monday 13 November 1978.**

Please quote reference SVN/778/CW.

Central Electricity Generating Board – North Eastern Region

Computer Operator

Watford
c.£4,000–£4,500 (2 shifts)

Robert Bosch Limited, a subsidiary of the world-wide Bosch Group, market a wide range of automotive and domestic products. We now seek a Computer Operator to join our IBM installation at Watford. Ideally you should have around 18 months experience on IBM hardware operating under DOS/POWER/CICS/VS, although training on CICS can be provided if necessary.

Benefits are those you would expect from a large company, including generous discounts on all our products.

For further information please telephone: Ken Dowling, Hardware Manager, on Watford 44233 extension 315. Robert Bosch Limited, Rhodes Way, Watford WD2 4L...

BOSCH

As a result of the further development and enlargement of our computer operations, Franklin Mint Ltd., the U.K. division of the world's largest private mint, which markets and distributes silver, bronze, pewter, crystal and porcelain collectibles and objet's d'art, will be taking delivery of a new Honeywell Level 64/40 early 1979. Consequently, we are now seeking to [illegible] the following two vacancies:

COMPUTER PROGRAMMER £5500 +

Applicants should have a sound educational background, together with a minimum of 18 months programming in COBOL, using the facilities of either a Honeywell Level 64 [illegible] under GCOS, or IBM 370 series, under OS [illegible] MVS. The successful candidate will also be able to display the qualities required to progress quickly in a fast moving environment.

COMPUTER OPERATOR £4650 (Including Shift Allowance)

Applicants should have a minimum of 12 months experience operating a Honeywell Level 64 operating under GCOS. Some experience of IBM System 3 equipment would also be useful, although not essential.

In addition to the salary, we operate a non-contributory Pension Scheme, free Life Assurance, free BUPA and give L.V.'s, maximum of 20 days holiday and a non-contractual bonus. We will be commencing interviewing in the [illegible] near future, so if you're interested, telephone Peter Brown now on 01-697 0121, or write to him at the address below:

FRANKLIN MINT LTD.,
130, BROMLEY ROAD,
CATFORD,
LONDON, S.E.6.

JOINT MATRICULATION BOARD

Universities of Manchester, Liverpool, Leeds, Sheffield and Birmingham

COMPUTER PROGRAMMER

Salary within the range £2886-£5129 (scale under review)

Programmer with at least two years' practical experience required for the Board's computer installation which operates an IBM 370/115. Some teleprocessing and/or systems analysis experience would be an advantage. For an applicant with relevant experience it might be possible to offer a salary on a higher scale extending to £5842 p.a.

Application form and further information from The Secretary (Staff C), Joint Matriculation Board, Manchester M15 6EU.

COMPUTER PERSONNEL APPOINTMENTS

PROGRAMMER/ANALYST
TROUBLE SHOOTING ASSIGNMENTS
CIRCA £5,000

A young person experienced in Cobol and Mini Computers, to travel from Midlands base to sites in the north and east. Duties include specification and installation of new systems, programming and support to accounting staff. Early promotion is envisaged.

THE PERSONNEL GROUP
65 NEW STREET
021-643-0951

SYSTEM PROGRAMMER c. £5,000

G PLAN

THE JOB: Maintaining and developing a DDS/VS system with POWER/VS, SHADOW 11T.P., on line SHADOW/QUOTA, PL/1, and RPG11. Also some application programming.

The successful applicant will be responsible directly to the Chief Programmer.

THE INSTALLATION: A 256K IBM370/125 with 3330 disks, tape and V.D.U.s.

REQUIREMENTS: Experience in system generation and maintenance, plus some assembler. Also, an ability to work under minimum supervision with maximum initiative. Experience in Shadow 11, PL/1 or RPG11 would be an advantage.

THE COMPANY: is a first-class employer and offers excellent conditions of service. Re-location expenses will be met where appropriate.

Please write briefly setting out experience to:
A. Sampson, Company Personnel Manager
E. Gomme Limited, Spring Gardens
High Wycombe, Bucks.

MICROPROCESSOR APPLICATIONS

The Computer Research Group in our School of System Design wishes to appoint PROJECT [illegible] work on the hardware and software aspects of micro[illegible] applications.

This is an opportunity for young graduates in [illegible] electronics, or a science based subject plus [illegible] experience, to enter the field of microprocess[illegible]

Project currently being run by the group are [illegible] staff are encouraged to cross the tradition[illegible] between software and hardware.

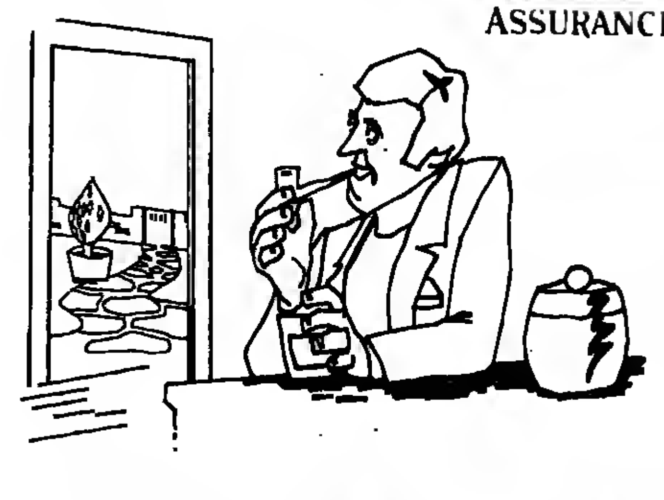
Salaries within the ranges £3384-£4[illegible] (under review).

For an application [illegible] to: The Employment [illegible] Cranfield Institute [illegible] logy, Cranfield, [illegible] MK43 0AL, or [illegible] ford (0234) 7[illegible] quoting reference [illegible]

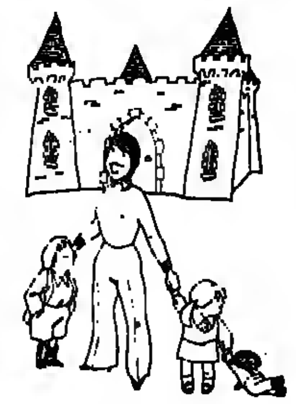
CRANFIELD INSTITUTE OF TECHNOLOGY
ADVANCED TEACHING • APPLIED RESEARCH

Oh those CU benefits... for Cobol Programmers

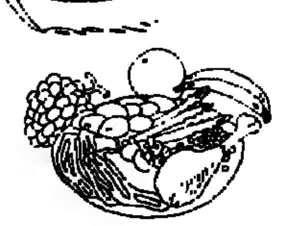
CU ASSURANCE



- MORTGAGE AT PREFERENTIAL RATE OF 5%
- EXCELLENT PENSION SCHEME AND LIFE ASSURANCE



- 33½ HOUR WEEK
- FLEXITIME
- PAID OVERTIME
- FREE LUNCHES
- EXCELLENT RELOCATION PACKAGE



As I sit looking down my garden at 4.10 on a summer afternoon I'm glad to reflect on the decision I made to join Commercial Union.

For a start I work a 33½ hour week with flexitime. I sometimes work a bit longer if I'm asked as the overtime pay comes in useful. Even so when I joined at £4,250 with only 1½ years COBOL experience it was pretty good. Some of my colleagues with 3 years COBOL earned up to £5,250.

And then there are the other benefits. Apart from the short working week I have an easy journey to the office. 5 miles in the car — 10 minutes with free and easy parking, or I can take the train to the station opposite the office.

The preferential mortgage and the company location help me to have a nice house in the country. The low cost pension and life assurance look after me, and the wife and kids. I eat well, with free lunches. When I joined them I moved house and the relocation package was great.

So join me at CU — ring CAPP ASSOCIATES quoting reference CW 43-8J and get things moving.

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS

CAPP ASSOCIATES
LONDON AND MANCHESTER

Computing Services Association

HEAD OFFICE: 01-686 9693 (24 HOUR ANSAPHONE)
19 PARK STREET, CROYDON CR9 1TN
NORTHERN OFFICE: 061 236 9085 (24 HOUR ANSAPHONE)
FAULKNER HOUSE, FAULKNER STREET, MANCHESTER M1 4YD

Advanced Systems ASI

ICL TRAINING — COURSE DEVELOPERS 2900 and VME/B

We have had 10 years' success in developing and marketing multi-media courses, with over 5500 customers worldwide.

Following contracts with the UK Government we are already developing courses for ICL users. We are now planning a major extension of this series.

Course Development Specialists £6000-£8000

We require two training specialists aged 27-35 ideally with experience in the development of course materials. You should have had 3 years' experience in an ICL environment, preferably including 2900 and VME/B. Training in education technology and the development of video-based packages will be provided in the USA.

These positions provide a rare opportunity to join the European market leader in this rapidly growing field and therefore offer exciting career opportunities.

Telephone JOHN KIRKHAM, General Manager, on 01-584 8652, or write enclosing brief career details to.

ADVANCED SYSTEMS INCORPORATED
1 Knightsbridge Green
(Entrance in Raphael Street)
London SW1X 7QA

UNIVERSITY OF NEWCASTLE-UPON-TYNE
NORTHUMBRIAN UNIVERSITIES MULTIPLE ACCESS COMPUTER

PROGRAMMING ADVISER (FOR MICROPROCESSORS)

Applications are invited from graduates to provide help and advice to members of the University wishing to connect microprocessors controlling experiments or equipment to the campus network. The network, based on LSI 11 microprocessors provides links to the IBM 370/168 central computer.

Experience with a range of microprocessors at the system design and support level is essential.

The appointment will be made on one of the following scales according to age, qualifications and experience: Range 1A £3,883-£6,555 per annum; Range II £6,060-£7,754 per annum. Membership of the appropriate University superannuation scheme will be required.

Further particulars may be obtained from the Registrar, The University, 6 Kensington Terrace, Newcastle-upon-Tyne NE1 7RU, with whom applications (three copies), together with the names and addresses of three referees, should be lodged not later than 24th November, 1978. Please quote reference CW.

JUNIOR PROGRAMMER/ANALYSTS AND TRAINEES

THE INSTALLATION

Established since 1967 the department is currently using:

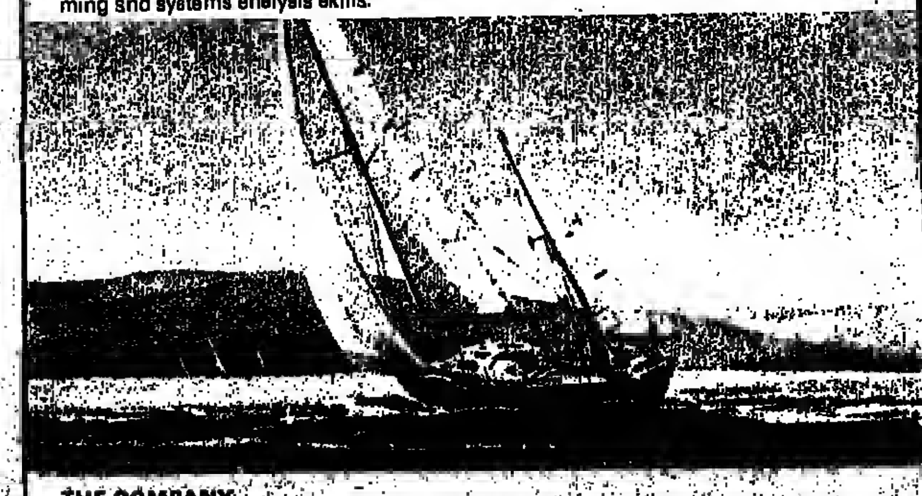
Twin ICL 2904's
5 EOS 60's
3 Nine Track Magnetic Tape Drives
1500 Equipment for distributed processing at five depots.
Communications Processors with Video Terminals.

THE JOB:

We require Junior Programmer/Analysts preferably with one year's systems experience and/or a knowledge of COBOL to support senior analysts with a considerable increase in business developments on a wide range of challenging projects. We have already installed local and remote communication systems which are being expanded.

Trainees should have two A levels grades A-C or HND/HNC in Business Studies.

Our 4 year career development scheme provides basic training in O&M, programming and systems analysis skills.



THE COMPANY

BDH is the leading manufacturer in the UK of laboratory and analytical fine chemicals. Our head office and manufacturing complex are situated on the picturesque Dorset coast at Poole. We have associated companies and distribution centres in the UK and overseas.

BDH

Telephone Parkstone (0202) 745520 Ext. 302 for more information or write to:—
Miss G. A. Weston (Personnel Officer)
BDH Chemicals Ltd., Poole BH12 4NN

BOURNS

ADMINISTRATION SUPERVISOR

London (Hounslow) £7,000 +

A world-wide U.S. company manufacturing and selling electronic components needs an Administration Supervisor for its U.K. Sales Division in Hounslow. (Est. since 1965).

The successful applicant will report directly to the Managing Director and have overall responsibility for all Order Processing and EDP functions.

A System 10 business computer is in operation and the immediate task is to derive maximum benefits from it and improve service to customers.

A recognised business degree or similar qualification is desirable and previous data processing experience is essential. The position may suit a person presently in a data processing position wishing to progress into business management.

A substantial bonus is payable and other benefits include a contributory pension scheme, life insurance, four weeks' holiday increasing with service and relocation expenses where applicable.

To apply, please write or telephone for an application form to: Philip Bullus, Joint Managing Director, Bourns (Trimpot) Limited, Hodford House, 17/27 High Street, Hounslow, Middlesex, TW3 1TE. Tel. 01-570 2596.

12 DOS COBOL PROGRAMMERS REQUIRED FOR EUROPE OR LONDON IMMEDIATE OR JANUARY START

RING: MARCOL
01-402 9355

"For crying out loud,

can't anyone design a system properly?"

If you've ever felt that strongly about the systems you're obliged to work with, you could be the man or woman for us.

If you're sick of living with other people's sloppy software design, we can offer more than just an end to your frustration.

If you're convinced that with your guidance things could be done better, and you're itching for the opportunity to prove it, we'll give you that opportunity – and the challenge, responsibility, money and prospects that rightfully go with it.

Don't imagine that we're talking about a conventional programming or analysis job. No, we're talking about a software job that very few companies recognise the need for (which is why your job gives you so many headaches).

We're talking about software quality engineering.

It's an issue that we take very seriously indeed, for good reasons. Our business is to produce strategically important airborne radar systems that are built around real-time computers. So corrupt data or a faulty response can have drastic consequences.

That's why we need men or women to apply the strictest quality standards to our software and its generation. The standards and quality procedures are already set: your task would be to apply them rigorously. To identify problem areas. To put people right where they've gone wrong, as tactfully as possible. In short, to provide the promptings that individual consciences don't always provide.

An unusual job, certainly. An interesting and worthwhile job, definitely. And, in a new discipline in a growing department in a highly successful company, a job with a future.

To find out more, write to the man who knows all about it – Geoff Parry, our Software Quality Manager. Better still, phone him direct on 01-953 2030 ext. 3791. Alternatively, write to H. E. Batchelder, Marconi Avionics Limited, Elstree Way, Borehamwood, Herts. Quote ref. MA 78112.

MARCONI AVIONICS
A GEC-Marconi Electronics Company

Norfolk

Systems Analyst

We are a privately-owned leading provincial newspaper group. Our modern Head Office is situated in the heart of Norwich, an exceptionally pleasant-looking city, close to the Norfolk Broads and within 30 minutes of a variety of resorts with golden beaches.

We currently use twin Univac 9480's with communications equipment to support our real-time advertising, accounts and text processing systems.

Candidates must have several years experience including the successful design, implementation and support of at least one major system. Experience of Univac 9000 series machines, Assembler level programming and real-time or newspaper systems would be an advantage.

We offer a competitive salary, good working conditions, four weeks annual holiday, a profit sharing scheme, pension and life assurance schemes, canteen and social club facilities and assistance with relocation expenses where applicable.

Application should be made in writing to:

Personnel Officer,
Eastern Counties Newspapers Ltd
Prospect House, Rouen Road
Norwich, NR1 1RE
Telephone (0603) 28311

HOLLAND

Share System Programming Ltd. is a company that specialises in providing system programming support for IBM users. We are looking for experienced

System Programmers

(£375.- - £425.- per week)

who are keen to tackle interesting projects and try a different lifestyle.
We also have an immediate requirement for System Programmers with the following experience:

CICS/VS, DOS/VS (and **TOTAL** or **DL/I** would be an advantage) **£380.00 per week.**

IMS DB/DC internals with **PL/I, BAL** and systems design experience to be part of a software development team – **£450.00 per week.**

If you would prefer to work as part of our permanent staff, instead of contract, we would be pleased to discuss a financial package of around £11,000 P.A. plus a company car.

Please write giving details of your career to: Mr. R. Voges, or for after work hours enquiries, call Mr. J. Owens on 02507 6001, and reverse the charges.

SHARE

Share System Programming Ltd.
Etna 19, 1186 CM
Amstelveen
Holland
Telephone: 010/3120/452022

Programmers c.£5,500 p.a.

Bring your experience to Kimberly-Clark in Maidstone, and share in our success.

Kimberly-Clark is a successful international organisation manufacturing such brand-leading paper products as Kleenex Tissues and Hi-Dri.

We require experienced Programmers to join a progressive installation engaged in developing interesting applications which include on-line systems and the use of data-base technology.

The required qualification is sound experience in a commercial programming environment, probably gained from at least two years in programming. The installation is based on an IBM 370/148 computer which is due to replace the existing IBM 360/40 computer in December.

Initial salary will be up to £5,500 according to experience, together with other fringe benefits including BUPA and relocation expenses where necessary.

So if you're looking for a better job, that offers a great future, then make the move to Kimberly-Clark and share in our success.

Please write or telephone JANE BARLTROP, KIMBERLY-CLARK LTD., Larkfield, Near Maidstone, Kent. Tel: Maidstone (0622) 77700.

Kimberly-Clark Limited, Makers of Kleenex Tissues
*Regd. Trademark Kimberly-Clark Corp.

PROJECT MANAGEMENT CAN BE YOURS! Sound technical background on IBM and self-motivation ... then this highly successful group would like to discuss your future. As a senior position would include control of development and design and specification of the system. Excellent company benefits.
REF. 1823

DO **YOU** want to join a young and enthusiastic team? If **YOU** have 18 months **RPGII** experience then apply **NOW**. Our client a major merchant bankers retains **IBM** system 3 hardware. They offer fantastic benefits including a subsidised mortgage and good promotional prospects.
REF. 1828

DECISION MAKER! International organisation seeks live wire to lead small project team from planning through to implementation. If you have experience in systems analysis in an IBM OS COBOL environment and want to enhance on your leadership responsibility then RING NOW. Excellent working conditions.
REF. 1904

FANTASTIC opportunity awaits a trainee with either a **DEGREE** OR **EXPERIENCE**. Company offers full **TRAINING** in **OPERATING** DL/I. This is a SUPER opening to get into programming with a company at the forefront of technology who retains IBM 370 hardware. **AMAZING** promotion prospects.
REF. 1901

EXCITING opportunity for programmer with 12 months COBOL experience to be trained in analysis. The company, a world leader in its technological field, has a large TP network with links to Europe and they offer full training in database and TP. **FANTASTIC PROMOTION** prospects for
REF. 1802

IMPROVE YOUR CAREER prospects! Do you find your present job dull and uninteresting? If you have around 12 months' DOS ASSEMBLER experience then this prestige organisation which provides technical services to clients, can give you the career you have been seeking.
REF. 1905

SUPERB opportunity awaits a Systems Analyst with NEAT experience with promotion prospects to D.P.M. within 12 months. Person will have full responsibility for the department during which time an upgrading of their hardware will be carried out. Company will be prepared to offer EXCELLENT fringe benefits including RELOCATION.
REF. 1857

NEW DEVELOPMENT! Newly installed mini computer seeks competent COBOL/FORTRAN analyst programmer. Working in conjunction with designers and specifying and writing programs for this system. Possibly supervising junior staff with knowledge of structured design and programming or T.P. an asset.
REF. 1892

For further details telephone our London Office 01-734 0152 (24 hours)

CONTRACT DIVISION

LONDON + HOME COUNTIES

IBM COBOL/ASSEMBLER OOS	HERTS	£200 p.w.
IMS COBOL OR ASS OS AN/PROG	KENT	£220 p.w.
DATAPOINT 2200 EXP	CITY	£220 p.w.
PDP MACRO II RSXIIM	C. LONDON	£200 p.w.
MINI ANALYST/PROG BASIC	N. LONDON	£220 p.w.
ANALYST T.P. EXP	E. LONDON	£230 p.w.
CORAL COMPILER POP II EXP PREF	HERTS	£230 p.w.
TEAM LEADER BASIC COMPILER	HERTS	£250 p.w.
PDP MACRO II + CORAL PROG	HERTS	£230 p.w.
SYSTEMS PROG DOS VS CICB	CITY	£275 p.w.
HONEYWELL EASYCODER	CITY	£210 p.w.
IMS PL/I OB/DC	CITY	£240 p.w.
ICL 2903/1900 COBOL	BURREY/ MIDDX	£190 p.w.
IBM OS PL/I	W. COUNTRY	£210 p.w.
2980 VMEB O/BASE PREF	MIDOX	£250 p.w.

OVERSEAS

DUTCH SPEAKING PROGS	HOLLAND	£NEG p.w.
IBM OB COBOL KN OF DUTCH	BELGIUM	£375 p.w.
SEN BYBTEMB PROG OS/DOS	MUNICH	£NEG p.w.
SYSTEMS PROG OS	MUNICH	£NEG p.w.
PDP FORTRAN KN OF FRENCH	BRUSSELS	£375 p.w.
IBM SERIES I ASSEMBLER	HOLLAND	£375 p.w.
PDP MACRO II RSXIIM	HOLLAND	£350 p.w.
IBM OS COBOL SPSS	HOLLAND	£360 p.w.
IBM SYSTEMS PROGS OS/DOS	HOLLAND	£400 p.w.
3790 EXP	HOLLAND	£375 p.w.

For details of the above and future contracts ring CHRISTINE KAY or DAVE HAYTON. Tel. 734-0152 (24 hours). 27 Noel Street, W.1. Offices Amsterdam, Paris, Manchester, Birmingham.

KNIGHT PROGRAMMING SUPPORT LIMITED

Computing Services Association

27 NOEL STREET, LONDON, W.1. TELEPHONE 01-734 0152/6 (24 HOURS)
OFFICES: AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM

SALES EXECUTIVES
(TERMINALS ETC)

BASE SALARY TO £7000 PLUS COMMISSION
PLUS QUALITY CAR

Superb opportunities have arisen due to planned and controlled growth patterns in the terminal and associated product areas, within a major Electronics Company.

We have been retained by our Clients, who have an enviable reputation, to identify sales personalities to operate in existing sales territories in London and the Home Counties, Scotland and the North East (preferably the candidate for the latter position will be located in the Edinburgh area).

Candidates for these positions should ideally have:

- ★ An understanding of terminal products
- ★ A qualification to Degree or HNC standard in a related subject
- ★ A confident sales personality to accompany a strong record in selling
- ★ Motivation and determination to succeed.

As may be expected from a major International Company, excellent terms and conditions including a relocation package are associated with these positions.

FOR FURTHER DETAILS CONTACT: Richard Champion on 021-236 3781 (24-hour answering service).

Ref. CW/11/1

SPECIALIST COMPUTER RECRUITMENT LIMITED

SCR

BIRMINGHAM 021-236 3781
Freepost, Equity and Law House,
35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0427
Freepost, Blackfriars House, The Parsonage, Manchester M3 2BB
LONDON 01-935 0671
Freepost 13, 3 Mandeville Place,
Wigmore Street, London W1M 5LB

Computing Services Association

SYSTEMS ANALYSTS LECTURER
£6,000-£7,750
CARDIFF/LONDON

A challenging opportunity for Systems Analysts who are seeking variety, good rewards and a role within an expanding organisation. The essential requirements are wide experience in their field with the ability to communicate clearly and succinctly.

Lecturing experience is not essential as there is a full training programme which includes the use of the latest technical teaching aids, eg CCTV.

The appointments are with our client, a well established computer services company whose dynamic ideas have built up a broad sphere of operations including a sophisticated education and training service to government, industry and commerce.

The package is good, up to £7,750 depending on age and experience, plus the usual benefits of a large company such as luncheon vouchers, pension scheme, etc.

To take action ring either number any time.

01-231 3459
051-236 7711

Modern Marketing Limited
Alembic House, Albert Embankment
London SE1 7UB

Computer Programmer
(Scientific Officer)

The Forestry Commission offers a period appointment of 3 years for a Computer Programmer at the Forest Research Station, Alice Holt Lodge, Farnham, Surrey.

Subject: The work is directed towards efficient processing of the data to be collected in a new additional Census of Woodlands and Hedgerows. It will involve close liaison with the statistician designing the sampling system and with the Census Officer in charge of the whole project and will include programming, system design, statistical calculation and computer terminal operation.

Age and Qualifications: Under 26 with an honours degree in mathematics or computer science plus some knowledge of statistics.

Salary: Within the range for Scientific Officer £2,638-£4,415 depending on qualifications and experience.

Closing date for applications. Application forms and further details can be obtained from Mr. A. J. Freeman, Forestry Commission, 231 Corstorphine Road, Edinburgh EH12 7AT. Completed application forms should be returned not later than 23 November, 1978.

SOUTHERN ELECTRICITY

SENIOR PROGRAMMER
FOR
REAL TIME SYSTEMS

Southern Electricity is engaged in the design, development and implementation of a large Telecontrol System. This will have a central complex containing ICL 2950 and PDP 11/34 Computers linked to a distributed processing system using Microprocessors located at nineteen different sites throughout Southern England. An opportunity now exists for a Senior Programmer to join the Computer Applications team engaged on this exciting project.

Ideally the successful candidate will have appropriate computing qualifications and at least two years' experience of programming for Real Time Systems. A knowledge of PDP 11 Computers and/or Coral 66 would be advantageous. Training will be given where necessary.

The position is based at the Board's Head Office near Maidenhead.

SALARY WITHIN THE RANGE £4,231 - £6,216 per annum.

Applications should be made on forms obtainable from The Secretary at Southern Electricity House, Littlewick Green, Maidenhead, and returned to him quoting 67/78 by not later than November 17, 1978.

UNIVERSITY OF SURREY
COMPUTING UNIT

SYSTEMS PROGRAMMER/ ANALYST

Systems Programmer/Analyst needed to exercise his/her initiative in a small team involved with design and improvement of systems using mainframes, minis and microcomputers. Projects may include packet switched networks and multi-processor and distributed processor configurations. We currently operate two ICL 1900 computers and a Prime system; replacement of the 1900 equipment is expected in the near future.

The salary scale will be up to £6666 per annum, with generous annual leave.

Applications, in the form of a curriculum vitae, and the names and addresses of two referees, should be sent to the Staff Officer, University of Surrey, Guildford, Surrey GU2 5XH, or telephone Guildford 71281, extension 470 for further information.

UNIVERSITY OF BRISTOL

Programmer
for S.C.R. Mini Computer

Joint Appointment in Faculty of Engineering/Computer Centre

The Science Research Council has recently installed a multi-user mini-computer at the University of Bristol. This computer is the first of a number of such machines which will form a national network providing advanced interactive computing facilities for engineering research.

A programmer/advisor is required from 1st January, 1979 or as soon after that date as possible, to assist various research groups in developing programs and to ensure that the advanced facilities available are utilised to the full. The mini-computer will be linked to the IBM 360 at the Rutherford Laboratory and the successful applicant will be expected to become familiar with the facilities available there and to assist research groups in Bristol to make the best use of them. The work will also involve the provision of communications links to laboratory experiments, and responsibility for all user documentation. This is an opportunity to work with a group of highly-motivated research workers in an extremely stimulating environment.

Applicants should have an honours degree in an appropriate subject (e.g. engineering, mathematics, computer science, physics). The salary scale for the appointment is Grade 1A on the Other Related Staff salary scales, £3,833-£6,555 per annum (salary scales are under review). The initial salary will be determined according to experience and qualifications and it is expected that the appointment will be made in the lower half of the scale.

Applications stating age, qualifications and experience and including the names of three referees should be sent not later than Friday, 24th November, 1978 to the Registrar and Secretary, Senate House, Tyndall Avenue, Bristol BS8 1TH (quoting reference JPB), from whom further particulars may be obtained.

Systems Controller
- Computer Operations

Expanding consumer services means developing new systems for management. At the Automobile Association we are involved in a wide variety of new projects - both long and short term; and to meet growing needs, we are presently in the process of expanding our computer capability with the installation of ICL 2900 equipment.

Applications are now invited for the post of SYSTEMS CONTROLLER within the Scheduling and Control Unit of the Computer Operations Department based at Head Office in Basingstoke.

Duties involve checking all new and enhanced systems for adherence to standards; liaising with Management Services and user departments on technical and operational matters; and being responsible for the correct and efficient operation of the AA's computer services, including the security of each system, training of new personnel and providing forward plans. Applicants, male or female, should have good 'A' levels and at least 2 years' experience of ICL computing. The ability to communicate at all levels is essential.

Salary is from £5,000 p.a., according to qualifications and experience. Benefits are in keeping with a progressive organisation, and include a comprehensive relocation package if applicable.

Please write to Kathy Holloway, Personnel Department.

THE AUTOMOBILE ASSOCIATION
AA
Fanum House,
Basing View,
Basingstoke, Hants.

VICTORIA APPOINTMENTS LIMITED

Shaw Carpets Limited

BARNSLEY — S. YORKS
Programmer Up to £6,000

This manufacturing company with a sophisticated D.P. organisation based on an IBM 370/135 under DOS/VS using CICS for real-time and local teleprocessing systems requires an additional [illegible] internal promotion.

The successful candidates will ideally have 12 months' IBM ASSEMBLER experience, although the company are prepared to retrain where suitable, and will join their enthusiastic team engaged on [illegible] Management Accounting systems.

The Company offers excellent terms and conditions of employment. Assistance with relocation available where necessary.

For an application form in respect of this and hundreds of other vacancies, please contact Miss Val Halliwell, Victoria Appointments Limited, 24 Mosley Street, Manchester [illegible] 7319 (24 Hr. Answering Service) and 061-236 7417 or home 440 [illegible].

Experienced Analysts
Minis/Mainframes up to £15,000

One of the most prestigious software companies in Europe is currently expanding their German operations in central Germany. Their business is based on a wide range of projects currently being developed on both Minis and Mainframes.

Due to this planned expansion, they want to meet several computer professionals who are competent in German. Technical background can be widespread but current priorities call for experience of System 370, 34, Nixdorf, PDP11, Nova, 2900, Siemens 330 and the internals of IBM DOS operating systems.

While our client can accommodate people seeking employment for a year or so, they definitely want candidates with medium to long term ideas about settling in Germany within the firm.

Ref CW 44/1

Systems People for MVS
Walton on Thames up to £6,000

A multi-million pound food group situated at Walton on Thames only half an hour from central London, have a need for Systems Analysts for their installation which will shortly upgrade their Dual 370/148 to a 3032 with the introduction of IMS Database under MVS.

We would like to hear from applicants who have had at least three years' Systems Analysis experience. Database and previous programming experience an advantage.

They can offer you the opportunity to be involved in a development of the Distribution and Packed Stock System for several depots and factories. Additional work includes significant enhancements to existing systems and developing applications for subsidiary companies.

Conditions of employment include Free Life Assurance, flexible working hours and relocation expenses where appropriate.

Ref CW 44/2

Opportunity in Sales
London, W1 £9,000 on quota

A unique opportunity has arisen for sales people to join a young and rapidly expanding Bureau and Systems House, who can offer ground floor opportunity to the successful candidates.

The Company, situated in W1, has a prime 400 and sells both Application Software and Time. The applications are mainly financially orientated so you will be selling to Accountants and Financial Directors.

The successful candidates will be aged in their mid-20s, and have had 2 years' selling experience, preferably in a Commercial environment, but this is not essential as full time training will be provided. It is envisaged that your career path will give you the opportunity to move into management with the growth of the Company

Ref CW 44/3

Technical Writers
Switzerland up to £15,000 p.a.

We wish to recruit 2 experienced technical writers for permanent positions with our Swiss clients.

The successful candidates will join large project teams, working up to 30 man years communications systems. Each technical writer will report to his project manager. The main responsibilities will include working to tight time scales, on the preparation of documentation and literature on the implemented projects for user purposes.

Candidates must have a proven track record in technical writing, and be prepared to work on their own initiative, servicing the needs of the project development teams in a highly progressive company in the communications field.

Ref CW 44/4

Systems Analyst
Dublin £7,500

An International Company requires an experienced Systems Analyst for a new development. Good commercial systems experience in a DOS/VS environment would be ideal, but successful candidates must have completed at least one decent commercial system. A programming background in Cobol would also be a help.

A top class salary and conditions of employment will be offered to the right calibre of applicant. Career prospects are good and relocation expenses will be provided where necessary.

Write or telephone Gerald Colemere at Dublin 789577.

Ref CW 44/5

Programmers & Analysts
£4,000-£6,000

Consider the benefits of

- ★ Working in West London
- ★ Working on communications systems
- ★ Progression to project leadership
- ★ Variety of job contact
- ★ Programme development through VDU's

If you are a Programmer or an Analyst and have had exposure to commercial applications (on any hardware), our client would be very interested to learn more about you and discuss your future. They are a well-established software house and offer a career path based on real time earning above average salaries and large company benefits.

Projects are divided into small teams and there are many opportunities for men and women with management potential to gain experience in project leadership at a very early stage

Ref CW. 44/6

Move into Systems with Telecommunications Network
Middlesex up to £6,500

A multi-million pound manufacturing organisation has an immediate need for SYSTEMS ANALYSTS to join them for the development of New Commercial Systems.

The Company, which is situated on the Hertfordshire/Middlesex border, has a large installation with Communication Networks running throughout the country.

We would like to hear from Programmers who would like an opportunity of moving into Analysis, or Analysts with 1-2 years' experience, who would like to be involved in the planned expansion with this go-ahead Company who offers excellent career paths.

Ref CW 44/7

Small Business Systems
West London ASSEMBLER £4500-£6300

A major International Systems House who are better known for their mainframe work, have a fast expanding Small Business Systems Division.

They have an urgent need to recruit people who range from Programmers with 2-3 years' experience, through to Senior Project Leaders.

All you need is experience of ASSEMBLER on any machine, but if you have experience of SYSTEMS DESIGN, REAL-TIME ORDER ENTRY, or ORDER PROCESSING so much the better. Projects are all based on Real-Time APPLICATIONS on the ICL SYSTEM 10 and SINGER 1500 hardware.

Project teams usually consist of 2-3 people, allowing you to follow the project from specification through to implementation.

Salaries are well above market rate and the company can offer excellent career opportunities, Annual Bonus, plus usual Company Benefits one would expect from a company of this size.

Ref CW 44/8

System Programming Consultants
for Distributive Projects
West London up to £9,300

A major international Software House has a need for the following specialised people.

- ★ Programmers with Assembler or ICL 7502 16 Bit Communications Controller Interfacing to a 2960.
- ★ Programmers with in-depth Singer 1501-1502 experience, which is linked to an IBM 370/148.

They also have a need for experienced Programmers to work large sophisticated 2900 projects using IDMS and TP.

The Company can offer an excellent salary package with the usual fringe benefits one would associate with a Company of this size.

Ref CW 44/9

CCC

Central Computing Consultants

KINGSTON: 44 Wood Street, Kingston upon Thames, Surrey, England. Telephone 01-549 3212. Telex 27950.
DUBLIN: Canberra House, 24 Lower Leeson Street, Dublin 2. Telephone 789577 (5 Lines).
Licensed annually by the Dept of Employment No SE(B)120

Operations Staff

...your career takes off here in Reading up to £5804

We're at the forefront of computer technology, we're successful and we're growing fast. This continuing expansion means that part of our Product Development Group based in Reading needs to take on more experienced computer operations staff. It also means that for the right people the career progression we can offer, in Reading and throughout the ICL Group, will be second to none. Check the details below to see where you could fit in.

Team Leaders – up to £5804
Senior Operators – up to £4450
(salaries inclusive of shift allowance).

Using ICL 1904S, 2903, 2904 and System Ten you will:

- Provide a communications based George 3 service for development support and maintenance of 1900 order code software.
- Service commercial workloads for the Software and Literature Distribution Centre.
- Create tailored software libraries and executives for all ranges of ICL machines.

We need to take on people with experience of the following:

- GEORGE 3 – preferably 8.1.3
- E6RM exec. – ops. exec. on a 1900
- E3RM exec. – ops. exec. on 2903

We operate an attractive shift system (no Saturday nights) and you will be able to enjoy our full range of large company benefits like our generous relocation package if you need to move.

Give your career a lift
Ring Charlayne Dale on Bracknell (0344) 24842 ext. 265 for write for an application form to ICL, quoting reference CW 1068, Personnel Department, Lovelace Road, Bracknell, Berks RG12 4SN.

International Computers

think computers – think ICL

ICL

LATENT VACANCIES i.e. JOBS NOT ADVERTISED IN SURREY, SUSSEX, KENT MIDDLESEX, BERKS, HANTS

FOR ANALYSTS AND PROGRAMMERS

Analysis has shown that jobs advertised by companies are few compared with the total number of vacancies available. Latent vacancies account for the greatest number of jobs available now.

Most companies in these areas register their vacancies with our consultancy as we have an established successful record specialising in the recruitment of computer personnel and executives.

We therefore have extensive knowledge of most latent vacancies in the South and South East — the equipment, languages, salaries and career prospects. We can inform you of vacancies that suit your requirements in the area of your choice.

This free information is just a phone call away. We have done the job-search, you phone us now and take advantage of our services

Telephone: Weybridge (0932) 41321 (Consultants).

ab executive (weybridge) TELEPHONE 0932 41321

Royal County of BERKSHIRE

SYSTEMS ANALYST
£5,232-£6,342
To design systems for County and District Council applications. Will have had at least two years' systems experience and responsibility for the design of at least one major system or alternatively a more extensive programming background.

PROGRAMMING TEAM LEADER
£5,232-£6,342
To lead a group of programmers within a project team and with responsibilities for the process of work and training juniors. Substantial COBOL experience required and experience in the use of an advanced operating system.

PROGRAMMER
Up to £5,073
COBAL experience required. The above staff are required for an ICL 2970 3 megabyte installation operating under VME/B with a wide range of application systems and a substantial terminal network.

Apply in writing with full details of age, qualifications and experience to: The County Treasurer, PO Box 12, Shire Hall, Reading. Telephone: Reading 55991, Ext. 53. Closing date: November 17.

AVX LIMITED

New Computer Installation in Northern Ireland

A.V.X. is a major manufacturer of ceramic capacitors and is setting up a manufacturing plant in Coleraine, Northern Ireland. Coleraine is a University town and is situated in a pleasant area near the famous Co. Antrim coast.

As part of our continuing build-up we will be installing a communications based IBM 370/138 computer early in 1979 and our planned development includes the design and implementation of on-line manufacturing and financial information systems.

As a first step in the development of our Data Processing Department we invite applications from experienced people to fill positions in the following areas.

- ★ **SYSTEMS PROGRAMMING**
- ★ **SYSTEMS ANALYSTS**
- ★ **PROGRAMMING**
- ★ **OPERATIONS**
- ★ **DATA PREPARATION**

The successful applicants will receive comprehensive training in IBM hardware and software and will be expected to actively participate in the setting up and future development of the Data Processing Department.

The salaries and conditions offered will reflect our intention to make the best possible appointments to these positions.
Please write or telephone Coleraine 2484 for application form.
The Industrial Relations Manager
A.V.X. LIMITED
Ballycastle Road, Coleraine
Northern Ireland

SOUTH MANCHESTER
PROJECT MANAGER
SALARY c.£7,000 + Bonus

PROJECT LEADERS
SALARY c. £5,500 + Bonus + Paid Overtime

Our Clients provide a complete range of systems to one of Britain's most successful industrial/electrical Groups. The diversification within the Group gives you the opportunity of working on a wide range of problems within a number of operating Companies. The Project Manager will take responsibility for the day-to-day running and forward planning of our Client's South Manchester site supervising 4-5 project teams. You should ideally have:

Experience of a manufacturing environment. The ability to accept challenge and lead and motivate staff. Preferably an understanding of on-line and Database techniques gained within an IBM environment.

The Project Leader positions require you to control complete projects and in some cases take responsibility for complete Company systems. You should ideally have:

A programming background. 2 years' systems development experience. The ability to lead projects from conception to implementation.

Our clients offer an excellent working environment combined with attractive terms and conditions of employment, including full relocation expenses where applicable.

For further details contact:
DAVID WADE/SHEILA BRADBURY on 061-833 0427 or 0785 56013 after 7.30 p.m.

SPECIALIST COMPUTER RECRUITMENT LIMITED

SCR

BIRMINGHAM 021-236 3781
Prepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0427
Freepost, Blackfriars House, The Parsonage, Manchester M3 2BB
LONDON 01-935 0471
Freepost 13, 3 Mandeville Place, Wigmore Street, London W1M 5LB

Computing Services Association

SYSTEMS MANAGER

Streatham — From £7,000 p.a.

James Walker (Goldsmith and Silversmith) Ltd., a leading retail jeweller with over 120 branches and a turnover of c£20M wishes to recruit a Systems Manager to complete a small management team currently drawing up a major long term development plan.

The successful applicant will be backed by a small computer department and will be responsible for a review of computer hardware, development of new systems from user specification to final implementation, and maintenance and support of existing systems. A systems analysis background is required, with at least three years' experience of commercial accounting systems.

This position offers interesting and varied work, a minimum starting salary of £7,000 p.a. which could be substantially increased for an exceptional candidate, and real prospects of advancement for the right person.

Applicants, male or female, should write in complete confidence giving full details of previous experience and current salary to P. Wagstaff, [illegible] Management Consultants, 40/43 Chancery Lane, London WC2 [illegible] reference L860.

A.I.M.

UNIVERSITY OF KEELE
Systems Programmer in Computer Centre
SYSTEMS PROGRAMMER
[illegible]

CHILTONIAN BISCUITS LTD.

ANALYST/PROGRAMMER

c £5000 p.a.

Chiltonian is one of the largest independent biscuit manufacturers in the country and we are based in S E London. Owing to expansion of business we are now in the process of setting up a new sophisticated on-line accounting and sales order processing system on a CTL 8050.

Applicants, male or female, should have at least 3 years' COBOL programming experience, be a self-starter and able to work on their own initiative. He or she will report to the Data Processing Manager and will work closely with management in other disciplines in helping to establish these systems.

Please write, giving brief details of career, to Jerry Butler, Personnel Manager, Chiltonian Limited, Manor Lane, Lee, London SE12 0TY Tel 01-852 9161.

JOBS, JOBS GLORIOUS JOBS for
PROGRAMMERS and SYSTEMS ANALYSTS
it's all systems go with VIP, etc
VIP
Call VIP CONSULTANTS 01-491 3266

SUPERVISOR
DATA PREPARATION
To take over from existing supervisor in a busy computer bureau in Exeter which is currently using Univac punch card machines
A thorough knowledge of Data Prep machines is necessary and previous supervisory experience is desirable.
Please write to Miss Joy Steele, Western Data Processing Ltd., 7/8 Colleton Crescent Exeter, Devon. Phone 34131.

COMPUTER MANAGER

... for production control systems

HERTS - NEW INSTALLATION

Realistic Salary + Car

You may be a manager already, or a systems person with 2 years project management experience and seeking departmental responsibility. Either way, if your background includes the design and implementation of production control systems in an engineering environment for about 5 years, this will interest you.
Our client, established for over 50 years, has built a reputation for producing a range of special purpose vehicles, incorporating rugged reliability and modern innovations, which keeps them ahead of their competitors, both in the UK and overseas.
To not only maintain, but also improve plant operational efficiency, the company will shortly install new computer hardware. The systems will be dedicated to providing management with all aspects of production information arising from applications which will include Materials Requirements Planning, Stock Control, Scheduling, and Product Costing.
A Manager is to be appointed, 30-40, mature, enthusiastic and self reliant. He/She, must be prepared to use previous technical experience to modify and implement manufacturers packages. Further staff will be recruited to create a small development team and the incumbent will assume the increasing management functions for the department overall.
The offices are located in a pleasant Hertfordshire town and a competitive salary is offered, company car, 4 weeks holiday, relocation assistance etc.
An immediate reply is advised by letter or telephone, quoting ref: CW 44-8D

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS
CAPP ASSOCIATES LONDON AND MANCHESTER
Computing Services Association
01-686 9693 (24 HOUR ANSAPHONE)
19, PARK STREET, CROYDON, CR9 1TN

HYDRO-ELECTRIC

SYSTEMS PROGRAMMERS

£4,660-£7,146

The North of Scotland Hydro-Electric Board will install in their Computer Centre in Aberdeen Dual I.C.L. 2960 computers in mid-1979 to replace their well established System 4 equipment.
An extensive terminal network will be supported and comprehensive software including database will be used.
Experienced Systems Programmers are required to develop this software and those with a knowledge of VME8, MAC, TP or IDMS would be particularly welcome.
Salaries will be in the ranges £4,660-£6,030 and £5,492-£7,146 including Productivity Bonus (Electricity Industry PAG3 and PAG4 scales) and generous assistance with removal costs will be given if required.
If you want job satisfaction in a stimulating environment phone Ken Hutcheon at 0224 692671 for further information or send details of your qualifications and career to.

Computer Services Manager
North of Scotland Hydro-Electric Board
Computing and Accounting Centre
200 Ashgrove Road West
Aberdeen AB9 2NY

PROGRAMMERS
£5,700 + mortgage + benefits

Join the computer department of a large American Bank in Central London developing Foreign Exchange and Loans/Deposit systems on their PDP 11/55s. When complete these systems will be implemented in their European branches.

Ideally candidates will be working for a financial organisation at the moment and have 2-3 years' programming experience using Basic, Cobol or Fortran, preferably on Minis although this is not essential.

You will receive excellent benefits including a subsidised mortgage, BUPA, Life Insurance, non-contributory pension scheme, free lunches and profit sharing.

Worth considering? Then contact LINDA BENSTED on 01-836 6775.

Computer Personnel International
Computing Services Association
110 St Martin's Lane, London WC2N 4BH 01 836 6775

JUNIOR PROGRAMMERS
£3,000 to £4,300 — S.E. ENGLAND

You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them.

CW44/1 Tricia

MINI COMPUTER PROGRAMMERS
£4,000 to £8,250 — LONDON & HOME COUNTIES

If you have experience in ASSEMBLER or micro-code or communications for at least 1½ years then a whole exciting field is open to you. We now have opportunities in S.W., N.W. or W. London, Surrey, Berks. and Hertfordshire for competent people in this rewarding field. The future is definitely going to be with the MINI-computer professional. Telephone for details.

CW44/2 Michael

DEC PROGRAMMERS
£4,500 to £8,500 — LONDON & HOME COUNTIES

We now have commercial user organisations and 24 Software/Consultancy firms looking for DEC Programmers [illegible] more experience. Why not [illegible] chance to improve both salaries and [illegible] persons are added [illegible]

CW44/3 Michael

SENIOR CONSULTANTS
£6,500 to £12,000 — CENTRAL LONDON

Six large, well established consultancies [illegible] to recruit [illegible] people with all-round experience [illegible] and the right personality to deal with clients [illegible] service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or ICL [illegible] ranges are essential. Excellent fringe benefits and [illegible]

CW44/4 Michael

JUNIOR PROGRAMMER
£4,500 — S.E. LONDON

If you have only just started as an RPGII programmer, this company will be interested in you. They only require six months experience on System 3. They offer help with relocation expenses and other company perks. You will help them in developing a new order entry and sales ledger system (we also have three companies in the city looking for more experienced RPGII programmers).

CW44/5 Michael

JUNIOR SYSTEMS ANALYST
c. £5,000 — N.W. LONDON

A major construction company with a small but powerful ICL installation requires a systems analyst with a programming background to work on a variety of commercial and engineering applications. Nice perks.

CW44/6 Michael

SENIOR SYSTEMS ANALYST
c. £6,500 — NR. HERTFORD

This organisation is involved in the travel business and therefore [illegible]

CW44/7 Michael

PROJECT LEADER
c. £7,000 — BRENTFORD

[illegible]

OPERATORS/SENIOR OPERATORS
To £4,200 Inc. — NR. MILTON KEYNES

A major engineering firm (offering an excellent relocation package) wishes to recruit several ICL GII or GIII operators. Other top perks include excellent training, 4 weeks hols and non C.P.S., with prospects of programming eventually.

CW44/9 Tricia

OPERATOR
£4,700 Inc. — W1

A 2 shift IBM DOS/VS GRASP system — just right for you! This progressive International company offers terrific perks such as free lunches, non-CPS plus excellent training facilities.

CW44/10 Tricia

OPERATORS
£5,000 Inc. — FELTHAM

Do you like bureaux work? Good, then this ICL GII and GIII installation will attract you. 3 shift system and 21 days hols., etc.

CW44/11 Patricia

OPERATORS
c. £5,000 Inc. — VICTORIA

If you have 18 months IBM OS experience, this commercial company will be interested in you. They have a 370/145 plus TP 3790's. Interesting 12 hour shift system allows generous time off. Lots of nice perks too.

CW44/12 Tricia

FREELANCE PROGRAMMERS
To £300 p.w. — UK & OVERSEAS

IBM	Systems Analyst	MSDC Berks	3 months
PDP/11	Basic	London, Berks.	3 months
IBM	Assembler OS	S. Coast	3 months
ICL	Cobol GIII	City	6 months
ICL	Systems Analyst	S.W. London	3 months
ICL	2904 AN/PROG	Bank in Nigeria	6 months

Apply NOW for the latest vacancies. IBM, HONEYWELL, DEC & ICL programmers welcome. Earn a Xmas holiday paid break plus an attendance BONUS. Ask for the Contracts Officer on 01-995 [illegible] Irene

UCA Recruitment Consultants
UNIVERSAL COMPUTER ASSOCIATES LIMITED
Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick W.4.
01-995 3883 (01-958 6498 EVENINGS)

Analysts and Programmers

Howard Machinery Group can offer you a relaxed professional working environment in rural Suffolk within easy reach of London. The area offers excellent recreational facilities, good schools and first-class housing.

Experienced Analysts and Programmers are required for the Computer Department of our Group Services Company based in Bury St Edmunds and supplying computer facilities to three U.K. companies.

Installation is an I.B.M. 370/138 1 megabyte operating under DOS/VS, CICS, with a DL/1 data base.

Analysts

The successful applicants will join a small team and be expected to make a considerable contribution to our development plans for the network which will include 'on line' production systems for our U.K. locations engaged in the manufacture of agricultural and industrial equipment. Experience in data base and on line systems would be advantageous

Programmers

Experienced in PL1 preferably with DOS, CICS and DL/1 data base.

For both jobs we can offer an attractive salary and flexible working hours. Training will be given if required and assistance with relocation expenses made available where appropriate.

Write in first instance giving career details to date to

John Betts
Personnel Manager
Howard Group Services
Sexham
Bury St. Edmunds, Suffolk
IP29 9QZ
Telephone: Bury St. Edmunds (0284) 93100

HOWARD

WESSEX
REGIONAL HEALTH AUTHORITY

System Design and Programming — Winchester

The computing services for the entire Wessex region are directly managed by the Authority and provide a service for all four Area Health Authorities in the region covering Hampshire, Dorset, Wiltshire and the Isle of Wight. Work is carried out on the following areas — Financial, Administrative, Manpower, Medical Hospital and other distributed systems.

There is a network of district based ICL 2903 computors and 7502 terminal systems linked into the main computer, a 1903T running under George 3.

Senior Systems Analyst/Programmer

(Scale 9)
Salary £4,659-£6,025

To be responsible to the Senior Systems Designer for detailed system design especially for the more complex parts of a particular application area for planning, writing and costing programmes within a system and for controlling the implementation of some projects.

You should have at least 4 years' experience including involvement in the development of at least one system which has gone into production.

Programmer

(Scale 4)
Salary £4,421-£5,326

Applicants for this post must have several years' experience in programming including an involvement in the successful implementation of at least one system. Experience of structural design methods COBOL ICL 1900 and 2903 series computers George 3 and NCC standards would be advantageous.

For further details and application forms please contact the Personnel Department, Highcroft, Romsey Road, Winchester. Tel. (0962) 63511, ext. 350.

Closing date 21/11/78

Telecommunications Programmers

IBM United Kingdom Laboratories Limited are looking for experienced programmers, male or female, to be based at their European Laboratories Computer Network located at Hursley, near Winchester.

You will need to have at least two years' Programming experience in one or more of the following: ● System/370 Assembler Language ● PL/1 ● BTAM ● VTAM ● Microcode ● Practical use of data bases.

Responsibilities will include the maintenance and enhancement of the advanced teleprocessing components of the Computer Network at Hursley and the development of programmes to manage the communications network more effectively.

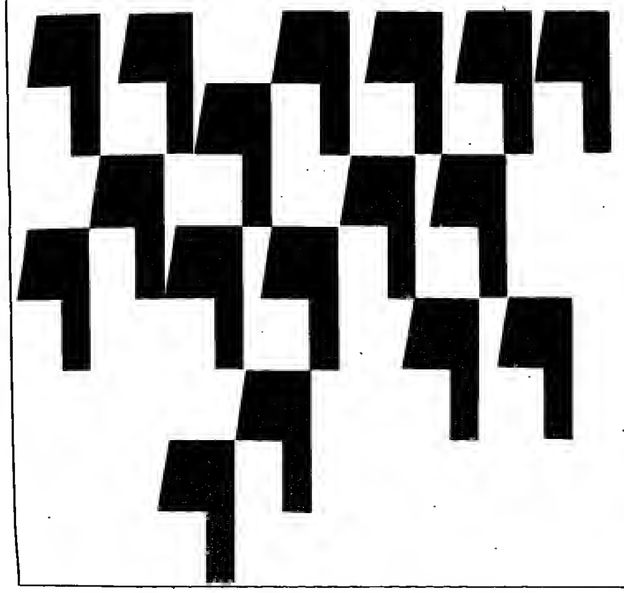
Ideally you will be educated to degree level, although candidates who have achieved an equivalent standard will be considered.

An attractive salary will be paid in line with experience and potential. As well as a substantial employee benefits package, which includes a non-contributory pension scheme and free life assurance, we offer generous assistance with re-location expenses where appropriate along with variable working hours.

Please write to or telephone for an application form: Ron Stotter, Personnel Officer, IBM United Kingdom Laboratories Limited, Hursley Park, Winchester, Hants. Telephone: Winchester (0962) 4433 (Extension 6232). Please quote ref: C.W./936770.

IBM

Financial systems · *Project management* · *Text Processing*
Dedicated minicomputer systems · *Scientific systems* · *Telemetry & Control systems*
Market Research · *Military systems* · *Customised hardware*
Microprocessor software · *Communications* · *Management Consultancy*



If you're good, we can help you go further

In 9 years Logica has grown rapidly to become one of the foremost European companies of its kind. The demand for our services has never been higher.

If you're good and want your career progression to depend only on your abilities and achievements Logica can offer you the breadth of opportunities you seek. Logica is an International organisation with operating companies in America, Australia, Holland, Sweden and the UK. Logica has never been only a software company but always as well, a hardware company, a management services company, a business systems company and a communications company. The excitement in Logica is to see how these technologies are complementing each other more and more in our project and development work.

If you are good, have relevant experience and would like to share in Logica's future, telephone the Personnel Department on 01-637 9111 or write to them for an application form Ref. CA/8. Logica Limited, 64 Newman Street, London W1A 4SE.

logica

SALES EXECUTIVE
SENIOR POST—LIVERPOOL
£7,000-£8,000

This post offers a world full of opportunity with our client who has a range of unbeatable products and services to sell. Salary scale of £7-8,000 reflects a true earning situation before the addition of an achievement bonus, pension scheme plus life assurance and a company car. Age range is 26-45. Location is Liverpool.

The successful candidate will be selling systems and program contract services, computer bureau services to government, communications and industry and industrial training services. Educational qualifications need be no 'O' levels plus commercial courses or 'A' levels and above. Professional experience should embrace data processing, hardware, programming and systems. Previous formal sales training and a proven track record in selling DP products are essential requirements.

Candidates will be assessed for future management roles, therefore a pleasant but forceful personality is just as important as total confidence in their knowledge of the computer industry.

Write or telephone Anna Sweeney for an application form.

01-582 2600

● **Modern Marketing Limited**
Alembic House, Albert Embankment
London SE1 7UB

PL/1 OR COBOL
Programmers to £6,500

WE CAN OFFER YOU:

★ GOOD SALARY—£5,000 to £6,500.
★ 370/138 HARDWARE WITH DOS/VS + POWER/VS.
★ ON-LINE PROGRAM DEVELOPMENT—USING SPMOL.
★ TELEPROCESSING—CICS/VS FOR 50 x 3278 V.D.U.s.
★ DATABASE—DOS DL/1.
★ NEW PROJECTS—FOR THE INSURANCE INDUSTRY.
★ FRIENDLY ATMOSPHERE—IN A SMALL BUT LIVELY TEAM.

INTERESTED?

Than if you have sound PL/1 experience or you are a COBOL programmer wishing to learn PL/1.

Ring for an application form on:
01-836 7376
or write to **Roger Foord** at:
The Policy Signing & Accounting Centre Limited
Temple Station Buildings
Victoria Embankment, London WC2R 2PJ

datascene CONTRACTS

FREELANCE PROGRAMMERS

register now for immediate and forthcoming requirements throughout

LONDON
U.K.
EUROPE

If you have 3 years in D.P.
If you want a top contract
If you want a top rate

CALL

BOB EDWARDS
TODAY

Datascene Recruitment Limited
Sceptre House, 169-173 Regent Street, London W1R 7FB
01-439 7871
24hour answer phone

THE OPEN UNIVERSITY
STUDENT COMPUTING SERVICE

USER LIAISON OFFICER
(Re-advertisement)

Applicants are invited for the post of User Liaison Officer at the University's headquarters in Milton Keynes. The Computing Service offers a nationwide timesharing service on DEC-20 and Hewlett Packard 2000 systems based at Computer Centres in London, Newcastle and Milton Keynes.

The successful applicant will be a member of the Operations section of the department and will be responsible for the acceptance and operational testing of inhouse user software and subsequent distribution. The Liaison Officer will work closely with all categories of user including development and academic staff engaged in the production of courses, ensuring that in the design and development of inhouse software proper consideration is given to operational implications.

This is a new position and offers interesting and varied technical work centred around our new DEC System 20 service. It is likely that the successful applicant will have experience in systems programming or Operations User support.

Salary will be on the scale £3,883 - £6,555.

The University offers attractive working conditions including seven weeks' annual leave and help with relocation to the Milton Keynes area.

Application forms and further particulars are available, by postcard request please, from The Recruitment Office (JO362B/2), The Open University, P.O. Box 75, Walton Hall, Milton Keynes MK7 6AL, or telephone Milton Keynes 63404, there is a 24-hour answering service on 63886.

Closing date for applications, 21st November, 1978.

SPL INTERNATIONAL

Overseas Projects
Europe and North America
£8k–£13k package

SPL has five thriving subsidiary Companies covering most of Western Europe. We also have growing interests in North America. Staff to work on projects abroad come from the U.K. company and some 40% of all our people are working on overseas projects.

Our overseas managers are now looking for—

★ **Minicomputer programmers with assembler experience/particularly people who know DEC, Data General, Honeywell, Philips or NCR.**
★ **Technical programmers with strong numerate background and familiar with system software concepts. Good FORTRAN and advantage.**
★ **Hardware trained technicians with a good knowledge of software at the H/W interface level. Experience of Micros especially useful.**
★ **Skilled computer people with practical experience of teleprocessing, distributed processing or message switching.**

If you want to work abroad with the attendant financial advantages and think you have the skills for us please phone or write:
Alan Taylor, Resources Manager,
SPL International,
12/14 Windmill Street,
London, W1P 1HF.
01-636 7833

SPL INTERNATIONAL

LONDON · NOTTINGHAM · MANCHESTER · BRISTOL · OXFORD · PARIS · BRUSSELS · FRANKFURT · MILAN · STOCKHOLM · HELSINKI · UTRECHT

AnCO—The Industrial Training Authority

Applications are invited from men and women for the following vacancy in the Data Processing Division of AnCO.

TRAINEE SYSTEMS ANALYST — DUBLIN

The successful candidate will participate in data processing activities with the objective of acquiring a comprehensive knowledge of AnCO's computer-based systems and becoming experienced in the use of systems analysis techniques.

Applicants should have a capacity for accurate detailed work, logical reasoning ability, some relevant background either academically or in terms of work experience. A degree or other evidence of formal training in computer-related subjects would be an advantage.

The salary scale rises to £5,640 per annum. Contributory pension, group voluntary health and sick benefit schemes are in operation. A programme of training and development in relevant computer related subjects will be provided.

Application forms, which should be returned completed, before Friday 10 November 1978, quoting reference 304, may be obtained from

Personnel Officer:
AnCO — The Industrial Training Authority,
P.O. Box 456, Baggot Court,
27-33 Upper Baggot Street, Dublin 4.
Telephone Dublin 01/686777.

AnCO
The Industrial Training Authority

PROGRAMMERS
Have you considered going back to college? . . . As a member of Staff

We require a programmer to join a small team in the Administration Systems Section which provides a computer programming service to the University Administration.

The section has the use of a dual ICL 1905E configuration, under DEC/OS and MAXIMOP, and a separate Philips visible records machine. You should be familiar with ICL 1900 equipment, software and operating systems and have experience of using COBOL and at least one low level language.

The work is interesting and varied and you will work in a friendly and informal atmosphere. You can look forward to a 35-hour week and a minimum of 24 days' annual leave, including public holidays. As a member of staff you may take advantage of many of the University facilities, cafeteries, library, free swimming pool, sports pitches etc.

Salary will be on the scale £3634 to 8054 p.a. incl. (under review).

To apply please write to the Personnel Office at the City University, [illegible] Square, London EC1V 0HB or telephone Mrs. K. Fowler on 01-253 4399 ext. [illegible] an application form and further details.

The City University

WORCS - GLOS - WILTS - DORSET
AVON - SOMERSET - DEVON
To £8k +

A wide range of vacancies exists from Programmer to Systems Designer in the above counties (25+ alone in Glos.). The equipment in use is also varied. It includes ICL 1900 and 2900 series, IBM 370, DG NOVA, PDP-11, Honeywell and Veirian. The languages vary from COBOL to ASSEMBLER to PLAN to PL/1 to Basic. In short there just isn't enough room to tell you about them all. Should you already live or wish to relocate to this expanding part of the world, then urgently phone Bristol (0272) 426631.

CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring Ian Carter for further details on 01-261 8016.

CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 pm on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring Ian Carter for further details on 01-261 8016.

FREELANCERS URGENTLY REQUIRED

Analyst/Programmers with the combination of IBM OS/MVS and ICL 1900 COBOL

Rate £200 p.w. Tel. David or Lincoln on 01 531 9141
MANHATTAN

ARE YOU LOOKING FOR SALES MANAGEMENT?

One of the Major Computer Manufacturers is looking for 2 experienced medium/large systems sales people, who have reached Senior Sales Executive or Junior Sales Management status, but are now ready for the next step.

You will be given responsibility for very large existing and new accounts, where you can expect to sell £2 MILLION to £20 MILLION systems.

The rewards are high. A guaranteed income of approx. £11,000 in the first year, plus bonus, which will give earnings of £14,000 to £15,000 per annum, but could be much more.

They want people who are mature, clear thinkers, sound business negotiators able to operate at all levels.

Excellent career structure, real management opportunities, etc., etc., exciting possibilities abroad.

If this interests you, please 'phone or write to the Senior Consultant quoting CW 177.

IMPC (IRELAND) LTD.
33 Mespil Road, Dublin 4
Telephone 681168, 681277

Insight Marketing and Personnel Consultants
33 Mespil Road, Dublin 4 Telephone 681168, 681277

SALES EXECUTIVES—

—NORTHERN ENGLAND

CAN YOU REALISTICALLY EARN £15,000?

If you cen sell, end have been successful selling small/medium business systems, this is a REAL OPPORTUNITY to join a Major Computer Systems Manufacturer — who offer:

REALISTIC TARGETS not ficticious ones.

REAL EARNINGS not promises.
Achieve tergets and you will earn £12,000 BUT most ere eerning £15,000

REAL PROMOTIONAL OPPORTUNITIES
The best cereer development structure in the industry.

PROFESSIONAL SUPPORT to help you achieve SUCCESS
This company, one of the most successful, is looking for Seles Executives who want to join in that success, make reel money and edvance their career.

Please 'phone or write to the Senior Consultant, quoting ref. no. CW 178.

IMPC (IRELAND) LTD.,
33 Mespil Road, Dublin 4
Telephone 681168, 681277

Insight Marketing and Personnel Consultants
33 Mespil Road, Dublin 4 Telephone 681168, 681277

Opportunities in GRAPHICS PERIPHERALS

A rapidly expanding and highly successful electronics Company specialising in computer graphics needs two young professionals, either with expertise in this area or with the desire to gain such expertise.

SALES EXECUTIVES

LONDON c. £5,500 + Commission + Car

You might already be selling, either in this field or mini-computers, or you could be working in sales support and want to start a career in sales. Either way you should have natural seles ability, willingness to undergo full product training and a strong desire to be successful in an exciting and specialised market place.

SOFTWARE SUPPORT

WEST COUNTRY To £6,000 + Car

You're probably an analyst/programmer providing customer support for a mini-computer manufacturer, and perhaps getting bored working on the same systems. We expect you to be experienced in ASSEMBLER, and some knowledge of FORTRAN would be useful. An ability to get on well with customers is very important. Knowledge of computer graphics is not needed as full training will be given.

FOR FURTHER INFORMATION, PLEASE CONTACT MARK IRENS QUOTING REFERENCE: CW/111/1.

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.

TELEPHONE: 01-353 7141 (24 HOURS)

Hutton
SPECIALIST RECRUITMENT CONSULTANTS

COMPANY TRAINING MANAGER

International Mini Manufacturer
Central London Based
Basic Salary Circa £8,000
Plus Substantial Car Allowance

Having enjoyed an excellent reputation in the highly competitive visible record and accounting machine market-place, our Clients are now establishing themselves as a leading supplier of small business computers through direct and indirect sales forces.

As part of their controlled expansion and Company development, we have been retained to identify suitable candidates for the key position of COMPANY TRAINING MANAGER.

While the successful candidate will almost certainly be currently employed within the small business computer market-place (either SALES, SALES SUPPORT, TRAINING or MARKETING) the candidate profile is deliberately open. However, it is crucial that applicants identify closely with the following job specification:

* The formulation of a total Company training program and responsibility for its implementation.
* Ultimate responsibility for the main training areas viz: SALES (PRODUCT & TECHNIQUES), SOFTWARE, ENGINEERING, MANAGEMENT and CUSTOMER; through the distribution of training responsibilities.
* The recommendation of the best training methods, and advice and assistance in the preparation of associated training materials.
* Liaison with the Training Board and the maintenance of formal and detailed training records.
* Naturally, where possible, to be involved in actual training courses, lecturing, etc.

THIS IS A FIRST-CLASS OPPORTUNITY TO FILL A KEY POSITION AND HELP DICTATE THE FURTHER SUCCESS OF OUR CLIENTS' OPERATION IN THE UNITED KINGDOM. PLEASE TELEPHONE THE ADVISING DIRECTOR, BOB BOWER, TO ARRANGE AN INTERVIEW. CW/111/2

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.

TELEPHONE: 01-353 7141 (24 HOURS)

Hutton
SPECIALIST RECRUITMENT CONSULTANTS

COBOL PROGRAMMER

Sterling Cable Company Limited, part of an international group, are one of Europe's foremost designers and manufacturers of industrial electrical cables. Our works and offices are located in rural surroundings on the A4, nine miles from Reading and Newbury.

We wish to recruit a Cobol Programmer to join a new team developing Batch and On-line systems for commercial and manufacturing applications. Configuration ICL 29D4-40K, MTS, EDS 30s, FEDS and VIDEOS.

Applications are invited from persons of either sex up to the age of 30 years. Experience requirements — one to two years' COBOL programming. On-line experience an advantage.

An attractive salary will be offered and benefits include 4 weeks' annual holidays and a pension scheme. Subsidised canteen facilities are available if required.

For an application form, please telephone our Personnel Manager, Mr. J. W. Reading, on Woolhampton 3221, or write to him at Sterling Cable Company Limited, Bath Road, Aldermaston, Reading RG7 5QD.

STERLING

UNIVERSITY OF ABERDEEN COMPUTING CENTRE

SENIOR PROGRAMMING ADVISER

The University has recently installed a large Honeywell dual processor 66/80 System supporting a large terminal network.

Applications are invited for the above post. Candidates should normally possess an honours degree in science or mathematics and have experience of programming in at least two high level languages, having worked in one of the following areas: scientific, mathematical or statistical applications, non-numerical applications, data base management or graphics. Applicants should have at least six years' experience.

Salary on Other Related Staff, Grade II Scale, £8,317-£7,754 per annum with appropriate placing.

Further particulars from The Secretary, The University, Aberdeen, with whom applications (2 copies) should be lodged by 17 November 1978.

FORTRAN
Programmers urgently required for Industrial and Scientific Development £3,500-£8,000
ALL AREAS
Phone for free list of vacancies
£57 555? day, £36 £59 eve

FREELANCE PROGRAMMERS
£180 to £400 p.w.
Tops, 6 mth. All Computers UP & OVERSEAS
01 995 3883
FREEPOST LONDON W4 3BR

DOS OPERATORS
No Nights
£4,500
RING GEOFF CARR
01-402 9355

OPERATORS

(BLOCK CAPITALS PLEASE)

Complete the coupon and return to the address below, for your next PERMANENT or CONTRACT job.

Name (in full) .....

Address (Permanent) .....

Telephone Home ..... Office .....

Type of Transport ..... Date of Birth .....

Current Position (Contract/Permanent) delete ..... Salary/Rate .....

Position Required (Contract/Permanent) delete ..... Salary/Rate .....

Notice Required/Date Available (delete) .....

Areas Preferred. First Choice ..... Second Choice .....

Experience to date: (Last Position First)

Company Name and Location	From Mth/Year	To Mth/Year	Hardware	Operating Systems/Software

Date ..... Signature .....

EFFECTIA GRAVIS
NATIONAL HOUSE, 66 WARDOUR STREET
LONDON W1V 3HP. 01-439 8481 (24 hours)

REG No. DATE

CW2/2/11/78

Data communications salesmen

Earnings up to £16,000 p.a. on a realistic quota with a growing United Kingdom manufacturer

We are: Nolton Communications Limited, leading U.K. supplier of short-haul data communications equipment, Modems, Data Network Control Systems, and all the accessories needed for the installation of a complete communications network. We also have a highly successful mobile radio telephone division. The company is based in Cheshunt, Herts, and has recently opened a Northern Office in Manchester.

We want: Sales Executives with a proven record in data communications in either sales or technical areas. Most important we are looking for people with the potential to progress rapidly within the company.

We offer: Sales territories throughout the United Kingdom, including two in the Southern Counties. Base salaries (dependent on starting point) range from £4.5K to £6.5K, with commission rates from 2% to 4% and above in certain circumstances. Benefits including car and expenses, are what one would expect from a progressive British public group.

The company's growth has been rapid, offering opportunities for rapid progressive progression into management.

Call Bob Warden, Sales Director, on Waltham Cross 33555 to discuss the matter further or for an application form

Nolton Communications Ltd.
Fieldings Road
Cheshunt, Herts EN8 9TL
Tel. (0992) 33555/33513
Telex: 28952

SYSTEMS ANALYST
(£4245-£5073)

PROGRAMMERS
(£3732-£4632)

A Systems Analyst with programming experience and two Programmers are required to join project teams developing a variety of systems on the Council's IBM 370/125.

Candidates should have a good academic background. Experience of Cobol and DOS/VS would be a considerable advantage.

Benefits include flexible working hours, 4 weeks' holiday, a staff club and subsidised canteen. In appropriate cases relocation expenses and lodging and separation allowances may be payable.

Application forms and further details are obtainable from the City Treasurer, Civic Centre, Southampton. Tel. Southampton (0703) 23855, Ext. 498.

Closing date November 15th, 1978.

Southampton City

South West Water Authority

2900 Development in Devon

The Authority has recently completed the transfer of systems from an ICL 1902T to a 2Mb 2960 running under VME/B and now offers TP, MAC and batch facilities, together with a BMEEP emulation environment, providing a production service for financial and technical applications and a development service for both COBOL and FORTRAN programmers.

Due to internal promotion, we now require a further

Cobol Programmer

Salary [£3667-£4161] plus £312 p.a. salary supplement at age 18.

with a minimum of 2 years' experience, preferably on ICL equipment in the 1900 and/or 2900 series, although suitable training will be provided where appropriate.

This is an excellent career opportunity for an enthusiastic applicant wishing to work in a stimulating environment in the South-West.

The post is based in Exeter.

Application forms can be obtained from the Personnel Officer, 3-5 Barnfield Road, Exeter, EX1 1RE (Tel. 50861) and should be returned not later than 15 November 1978.

ROBERT GORDON'S INSTITUTE OF TECHNOLOGY, ABERDEEN
COMPUTER SERVICES UNIT

ASSISTANT PROGRAMMER

A vacancy exists in the Computer Services Unit for the above post, to assist in developing application programs in support of the Institute's teaching commitment. These applications are primarily written in COBOL and run on the Institute's DECSystem-20 computer.
Salary scale £2566-£3270 per annum. Local Government Superannuation Scheme.
Application forms and further particulars are available from the Chief Administrative Officer, Robert Gordon's Institute of Technology, Schoolhill, ABERDEEN AB9 1FR

CAPITAL APPTS.

GRADUATES
Urgently required for Trainee positions Industrial, scientific and Commercial situations
SALARIES c £3,000
ALL AREAS

29 Windmill St. London, W.1.
637 5551 day; 636 9659 eve.

SCOTTISH HEALTH SERVICE

Appointments to the Computer Department of Grampian Health Board

The Grampian Health Board, which is responsible for provision of Health Care Services for a population of 460,000 in the North East of Scotland has the following vacancies in its Computer Department based in Aberdeen

SENIOR SYSTEMS DESIGNER
Salary £5537-£6715

Candidates should have considerable experience of computer systems and would be expected, initially, to assume responsibility for the development of financial and budgetary services to the Board.

SENIOR PROGRAMMER/ANALYST
Salary £4959-£6025

Candidates should have significant experience in computer systems, or database techniques. The post would initially involve the further development of a medical information system.

Application forms and further details of these posts are available from the:
Area Personnel Officer
Grampian Health Board
1 Albyn Place
ABERDEEN AB9 1RE
Telephone 0224 29901, extension 320

Closing date November 20th, 1978.

RPG11 CONTRACT PROGRAMMER

Required for 3 to 6 months' contract East London.

Focus Computer Services (EMP AGY), 28a Devonshire Street, London, W1. 01-487 5781.

WALES AND WEST COUNTRY RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on November 23 and will highlight career opportunities in Wales and the West Country.

Space reservations should be made as soon as possible to:

Basil MacGowan
Birmingham—021-356 4838
Eddie Farrell
London—01-261 8097

Copy Deadline: PM Friday before

COMPUTER WEEKLY
THE INDUSTRY'S WIDEST READ AND MOST RESPECTED NEWSPAPER

Salesman

High Growth Market — **Manchester Based**

c. £12,000 Package — Company Car or Car Allowance

Our client is a rapidly growing DP Division of an established International organisation, designing, manufacturing and marketing its own products. The Company's distributed processing products represent a comprehensive range with the emphasis on intelligent terminals and network processors. The systems offer high quality and value to a wide range of financial, industrial and government users in this rapid growth sector.
They would like to hear from men or women with proven sales experience in the main frame, bureau or small systems markets, who now wish to enter the rapidly expanding distributed intelligence and terminal markets.
The Company's growth rate is such that it is also interested in discussing sales careers with other experienced DP people.

Ref: S3740/CW

Replies will be forwarded direct, unopened and in confidence to the client unless addressed to the Security Manager listing companies to whom they should not be sent. They should include comprehensive career details, not refer to previous correspondence with PA and quote the reference number on the envelope.

PA Advertising
Hyde Park House, 60a Knightsbridge, London SW1X 7LE. Tel: 01-235 6060 Telex: 27874

A member of PA International

TOP SALES EXECUTIVES

COMPUTER SYSTEMS — **BRISTOL**

EXCEPTIONAL OPPORTUNITY

An exceptional opportunity has arisen for two senior sales executives to join a new subsidiary of an established Public Company, marketing a range of microprocessor based computer systems with U.S.A. software for order entry, stock control, purchase sales and nominal ledger, bill of materials and production planning.

The positions require a special ability to sell computer equipment in the range £10k-£40k to financial and production directors and an ability to negotiate at the highest levels of management.

Remuneration will include company car, contributory pension scheme, life insurance, basic salary, commission and profit sharing, and will be well into five figures for on target results.

Replies to Director of Sales, Wilkes Computing Limited, Bush House, 72 Prince Street, Bristol.

D.P. MANAGER
IBM SYSTEM 34
SALARY £8K + CAR

D.P. Manager required responsible for implementing completely new system for company involved in shipping industry and located in the city. The manager will be expected initially to develop the system suitability which will involve travel to the Far East & U.S.A. and undertake staffing of installation. Benefits include after 26 week probationary period; company car, private medical plan, private pension plan, accident insurance, sickness insurance, holidays 3 weeks increasing to 5 weeks.

Please write enclosing a C.V. & Tel. No.
To Mr M. R. K. Wilson
Green Jack Shipping Agency (UK) Ltd.
7th Floor, Plantation House
31/35 Fenchurch Street, London E.C.3

Interviews will be held in London on 11th/12th December.

THE SALES BIT

Picking right time to present that glossy brochure

IN a job like mine where one is supplying a range of services within a sales and marketing environment across the whole spectrum of the computer industry, comparisons are inevitable.

A particular area in which one is exposed to extremes of taste and judgement is sales literature. Within the scope of a small number of computer companies one can witness a myriad of possibilities from the gaudy, banal and pointless to the tasteful, succinct and objective.

I often wonder how some material ever got as far as the printing press, such is the appalling presentation and failure to fulfil the basic function of an effective sales aid.

One can only assume that in such cases the total process of generation and evaluation is embraced in the single act of: "It's about time we had some decent sales literature, see what our advertising people can come up with" — or words to that effect.

Certainly, I have known many situations where there has been no real involvement by sales and marketing personnel between the initial demand for sales literature and the receipt of the completed article by salesmen in the field.

The creation of sales literature, like so many aspects of sales management, cannot be effective if it is carried out in a vacuum.

There are so many benefits to be gained from harnessing the objective and creative capabilities of sales and marketing people, both in the field and in the office, that it is essential to solicit their ideas and opinions; whilst at the same time ensuring that the "horse" that is being designed does not become a "camel" as a result.

There are two primary considerations to be made in the context of sales literature:

- How should it look?
- How should it be used?

The answer to the latter question is less complex than the first, so I will start with that one.

The main function of sales literature is to confirm a sales story which has already been told. It can also be used to emphasise a particular point within the sales story; but care should be taken not to hand over the material to the client until the sales presentation is completed.

This is no better a method of pre-empting the major features of the sales story, no surer way of losing the client's attention, no more reliable a device for becoming side-tracked than allowing the potential buyer to get his hot little hands on a nice shiny sales brochure.

After all, the material has (hopefully!) been designed to be eye catching and able to hold the reader's attention, so what is his incentive for listening to the salesman's "biased" argument when he can see the product for himself and make his own decisions? So salesmen, beware!

Sometimes sales literature can be used to create a sympathetic environment within which the salesman can justify an initial sales call; but this is a very risky practice.

More often than not, mailing sales literature has the opposite effect to the one intended. That is: it becomes a justification for the client refusing to see the salesman.

"I've read your brochure and consequently have a good appreciation of your products. If we ever want any we'll let you know" or "It is clear that your products and prices are very similar to those we are already receiving from another supplier and with whom we are completely satisfied."

This action once again pre-empts the sales argument and the application of benefits to the potential buyer's unique situation. The salesman is immediately in a defensive situation, justifying the very call itself rather than the direct benefits of the product to the client.

This situation is not only unsatisfactory but also doubly difficult because dialogue becomes locked into written and telegraphic communication rather than face to face.

The ideal sales literature to precede the first sales call is a personal letter which can limit the dialogue to the bare essentials, i.e.: "This is who we are, this is what we do (perhaps including some reference sells!), this is why you should see me, this is when I will telephone you for our appointment."

No details, just bold statements. One piece of sales literature that can sometimes give some extra "zap" to a first contact letter is a corporate brochure of financial report.

Such documents tend to be primarily devoted to the "Who we are" rather than the "What we do" and therefore have much less risk of destroying the salesman's pitch.

The salesman must ensure that the qualification of a prospect's potential business is within his control rather than the client's. This is where effective "desk-prospecting" is essential. The mailing of sales literature is, in effect, passing responsibility for that process over to the client.

Always bear in mind that the potential buyer is typically a very busy man who already finds it difficult to get all his jobs done in the time available without the added pressure of seeing someone who wants to sell him something he has been able to manage without up to now.

It is much easier to say no to a piece of paper than a salesman — usually!

More next week.

TRADER

PRODUCT NOTES

Graphics VDU

INTERACTIVE process monitoring and control is the main application area for the 3977 graphics display unit now available from Siemens.

The 3977 comprises a minicomputer controller and up to four monitors can be used to select and examine any parts of a particular graphics frame in detail using a joystick that can move a "window" continuously over the frame.

The operator can also add to the contents of the screen interactively using a keyboard and light pen. Software provided by Siemens with the 3977 enables graphics symbols and images to be created and stored in an image databank.

Siemens AG, (CW), Postfach 3240, D-8520 Erlangen 2, West Germany. Tel: (8131) 73394.

Puzzle Answer

IN the simpler ordinary derangement problem, a derangement of the natural order of n objects (integers) 1, 2, 3, ..., n-1, n is given by a(1), a(2), a(3), ..., a(n-1), a(n) with a(h) ≠ h. Now interchange a(n) with one of the (n-1) possible symbols, say a(h). If a(h) ≠ n, this is an (n-1)th order derangement, but if a(h) = n (and of course a(n) = h) this is an (n-2)th order derangement.

If D(n) is the number of derangements of order n, then D(n) = (n-1) × D(n-1) + (n-1) × D(n-2), with the initial conditions D(1) = 0, D(2) = 1. In the present problem, a double derangement of 1, 2, 3, ..., n-1, n is given by a(1), a(2), a(3), ..., a(n-1), a(n) with a(h) ≠ h, and b(1), b(2), b(3), ..., b(n-1), b(n) with b(h) ≠ h, b(h) ≠ a(h). For each of the D(n) original derangements h → a(h), there are D′(n) secondary derangements a(h) → b(h).

Now b(n) ≠ n, and b(n) ≠ a(n), so that b(n) can only be changed with one of (n-2) possible symbols, say b(h). If b(h) ≠ h, this is a D′(n-1) derangement, but if b(h) = h it is a D′(n-2) derangement.

Also D′(1) = 0, D′(2) = D(1) = 0, D′(3) = D(2) = 1, and D′(n) = (n-2) × D′(n-1) + (n-2) × D′(n) = D(n-1). Evidently, D′(n) = D(n-1).

Thus the number of double derangements of order n, given by D(n) × D′(n), is actually D(n) × D(n-1). But for n = 5, D(5) = 44 and for n = 4, D(4) = 9. So for n = 5, the total number of double derangements is 44 × 9 = 396.

SDI

IBM Hardware Specialist
Computer Operators
Technical Writer

HARDWARE SPECIALIST

We require a **UNIQUE INDIVIDUAL** to become our Hardware Specialist.

The successful candidate should have in-depth knowledge and experience of large scale IBM equipment including 360 and 370 CPUs and I/O.

Currently SDI are at another exciting stage of our continuing ambitious research and development program of software development needs for the 1980's, of which the successful applicant will play a very important role.

The position offers you a chance to work a normal day with no more road running by car, and will involve providing specialist support to associated companies who have their own systems. You will need the ability to evaluate and recommend on Hardware investment, which will not restrict you to current IBM technology (Series A, B, C, D or even E?), and you will have the option to be educated in advanced Software development techniques. The success of this demanding, out-of-the-ordinary job will depend largely on what YOU can make of it in an international group dedicated to future expansion.

OPERATORS

— Where are YOU?
— We are here in High Wycombe
— We are SDI
— SDI operates IBM 360 and 370 equipment, developing software packages like GRASP, FLEET and EPAT

OPERATORS — Are you BORED or FRUSTRATED?

You may be one of many who feel trapped in a job without prospects of promotion or opportunity to get involved or develop and use your talent effectively.

An SDI career could not be more different. No mundane production work, but interesting and involved software creation.
Working for SDI, a company in the forefront of software development, your skill and energy will be appreciated and rewarded. Sociable two-shift system. Start the ball rolling today—'phone (0494) 20947 or complete coupon below.

TECHNICAL WRITER

for Computer Software

Are you a TECHNICAL WRITER with or without relevant experience or PROGRAMMER/OPERATIONS person capable of technical writing?
The position requires a person who can take complete responsibility for the writing and production control of SDI Technical Manuals for both users worldwide and company, internally.
The successful applicant should possess:

★ ability to write clear, accurate technical documents
★ knowledge of IBM DOS or DOS/VS operating systems
★ excellent command of English language
★ ability to work without supervision

SDI operates an in-house computerised text maintenance system which will be a major tool of the job.
To apply, preferably with an example of your work, 'phone (0494) 20947 or complete coupon below.

SDI conducts innovative research and development techniques which continue to keep it a leader in the independent software industry. The type of environment provides not only a stimulating challenge, but also very competitive salaries and a comprehensive company-paid benefit package which is continually being developed. The positions are not jobs of today or yesterday but JOBS FOR THE FUTURE. Read no more, 'phone High Wycombe (0494) 20947 to obtain further details of each job with their HIGH REWARDS, or complete coupon and send to: SDI, PO Box 84, High Wycombe, Bucks.

NAME .....
ADDRESS .....
.....
Bus. Tel. No. ..... Home Tel. No. .....
CURRENT JOB TITLE .....
POSITION APPLIED FOR .....

Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

Block 20 (Blockhead)

Having dispatched Ascii on a top-circle mission to Fort Ranfour with Dr Null's contagious gigolic induction program embedded in his pericardia, Hex rejoins his fellow outlaws at Sprocket's Hole. In the small hours his repose is shattered by a signal on his personal radio. Simula is trying to make contact.

"HEX? Are you receiving me?" came Simula's inquiring voice again, crystal-clear through the ether.

"Receiving you loud and clear. Over."

There was a crackle of static, then her reply: "I can't hear you too well. Can you increase the power of your transmission?"

Hex hesitated. His transmitter was for local use as a walkie-talkie in and around Base 16. So was hers, but evidently she had got hold of an amplifier. If there was one thing the System would like, it was a nice strong radio beam to take a fix on.

He looked around at his companions asleep on the wooden floor. To give away his own position was bad enough, but if he were caught they would fall with him.

"Hex?"

If it had been Fetch or Execute, he might have suspected a trick and shut up. But Simula? Surely she was incapable of treachery. His reply went out at normal strength: "What is it?"

"Listen," she responded instantly, "I still can't hear you very well, but this is an emergency. I'm being held captive at Fort Ranfour. They want to use me to lure you in. I must warn you: don't come even if I ask you. Do you understand?"

"What do you mean?"

"Don't on any account listen to any further broadcasts I make. They may torture me and I may agree to ask you to meet me somewhere; but IGNORE ill OK?"

"Torture you?" Hex's mind was reeling.

"It's no good," she said, "I still can't hear you clearly. Just remember what I've said. Don't listen to me after tonight, no matter what. Bye, Hex. Good luck."

Hex boosted his transmitter to full power. "Simula! Wait!"

"No. It's not safe to go on. Someone might eavesdrop. Over and out."

"Simula, I have to tell you something too. Don't go yet."

But all his calls were unavailing. She had closed down for the night.

He switched off his FM set. This bolt from the blue had stirred up a gaggle of unresolved questions; but none more insistent than this: Why did he have the receiver on in the first place? Why, since leaving Base 16, had he kept that channel permanently open? There was really only one answer.

He rose to his feet, careful not to disturb the other sleepers. He could see only one way ahead. Simula had warned him not to contact her; but he hadn't had time to tell her that Ascii was on his way, primed to destroy Fort Ranfour. As soon as Ascii arrived the whole System would go gigolic, and in that conflagration Simula would undoubtedly perish. He owed it to her: he must go to Fort Ranfour and bring her out alive.

He tiptoed outside. It was another sharp cool desert night. The stars were precise pinpoints. He felt wide awake and raring to go. He walked away from his comrades with no real thought for the consequences of his action.

His mind turned to Cleo. At 16, he decided, she was just too young. He was 55 and though in terms of the android life expectancy of 255 years and he was still a stripling (hence his nickname, the Hexadecimal Kid) it made him too old for her. She had plenty of spirit, all right: she was a plucky girl. The trouble with Cleo was that she was too possessive. She was very stubborn about not getting cybernated too. She had a pathological phobia of all things electronic. All she wanted was to settle down on some reservation — free from interference by the Information Society — and raise a family. It was not a prospect he could share with any enthusiasm.

The first hint of dawn tinged the sky. He quickened his rather leisurely pace. Fort Ranfour was near San Jose. The quickest way was to head north through Silicon Valley. That meant crossing the ruins of the human reservation again.

When it grew light he left the road and made his way across rough country. In the early afternoon he came to the desolate reservation. He was amazed to find that the humans were back — a few of them anyway. In the centre of the ghost town some tents had been erected, and the smoke from a cooking fire was curling lazily into the air. You had to give these humans full marks for tenacity: like rats, it was hard to keep them down for long.

He gave them a wide berth. A lone android could expect no mercy after their treatment at the hands of the Night Operators. He didn't want them venting their spleen on him. So his path led, skirting the city, to the wooded hillock where he had buried his father, Abraham Synapse. It seemed more than one lifetime ago.

Feeling in a contemplative mood, he scratched about, turning over the fallen leaves with a stick; but he could find no sign of the grave. Professor Synapse (or Dr Null, as he still thought of him) had returned to the earth.

He sat down and reviewed events since he had last been there. The System circulated horrific tales of data-starvation, but they were largely bogus. Now that he had written a neat little forgetting algorithm he had had no more trouble with directory overflows, and his average access time was greatly reduced. Of course he had to lose certain trivial details, but he had come to prefer it that way.

Forgetting, he concluded, was very important. The uncritical hoarding of information was a great handicap. If the Database could only renounce its miserly attitude towards data, half its problems would disappear overnight. After all, everyone knew that data expands to fill the storage allotted to it.

Has he forgotten something? More memorable incidents next week.

© 1978 Richard Forsyth, Rels Timesharing.

PLAN YOUR CAREER WITH PRESCOT

ENGLAND, AUSTRALIA SOUTH AFRICA and NEW ZEALAND

£4,000 to £12,000

Careful planning often makes the difference between the successful and the not so successful computer career. Prescot Computers understand this because we specialise in overseas computer recruitment and the selection for an overseas post requires extra care by Prescot, employer and employee. We use the same principles of care whether U.K. only or overseas employment is involved.

We currently wish to interview **Programmers, Systems Analysts, Analyst Programmers, Consultants and Sales People** for a broad range of clients in England, Australia, New Zealand and South Africa. Salaries range from £4,000 to £12,000 p.a. If you are interested, why not telephone **Chad Stolper on (01) 242 2142** for an informal discussion.

Alternatively if you prefer write to him at:

Prescot Computers Limited
6 Bloomsbury Square
(01) 242 2142 London WC1A 2LP Telex 23110

PROGRAMMERS

HOLLAND to DFL 43,800/£11,000 PLUS BONUSES

Unique opportunity exists within international company dealing with household and industrial products. Based centrally in ROTTERDAM, the organisation retains IBM 370.138 using COBOL and runs under DOS/VS CICS/VS with use of DL/1 Database. Programmers and analyst/programmers are required to assist in the development of on-line commercial and financial systems. Prospective candidates should have between 2-3 years' sound COBOL experience.

★ First-class career structure
★ Well organised projects and working teams
★ English-speaking company
★ 8% vacation allowance, 8% profit share
★ RELOCATION EXPENSES

For further details ring or write to:

KNIGHT PROGRAMMING SUPPORT LTD.
27 NOEL STREET, LONDON, W1
01-734 0182, 24 hours

GN

FLEET SALES EXECUTIVE

GN, a successful rapidly expanding Group of Motor Dealerships in Surrey need a Fleet Sales Executive.

If you have experience dealing with business heavyweights and the enthusiasm can match our ambitions, ring Colin Smith on 3686.

SAFE

COMPUTING LIMITED

WOKINGHAM
BERKSHIRE

JUNIOR PROGRAMMERS
PROGRAMMERS
ANALYST PROGRAMMERS
ANALYSTS

£3,000 to £6,200

Safe Computing Limited is a fast expanding software house employing over 170 people in the UK, offering a full range of computer services.

Safe has now opened a new office in Wokingham and is looking for staff to help install, support and develop its highly successful production control and accounting packages, as:

SAFE REQUIRES:
- **Career minded professionals.**
- **Knowledge of at least one low level or Assembler language.**
- **Ability to work to deadlines.**
- **Flexibility and mobility.**

ARE YOU:
- **Stifled by lack of promotion prospects?**
- **Restricted by knowledge of only one machine or application?**
- **Office bound, bored?**

SAFE OFFERS:
- ***A career with one of the fastest growing software houses in the UK. Early responsibility and customer contact.***
- ***Large company benefits, small company opportunities!***
- ***Index-linked, inflation proof salaries.***
- ***Excellent company mileage allowance.***
- ***Opportunities for overseas travel.***

SAFE WILL TRAIN YOU ON:
- **The ICL System Ten minicomputer and others.**
- **Production Control Systems — SAFAS package.**
- **Inflation accounting, costing and ledger systems — SOFA, SCIRT & SOLAR packages.**

INTERESTED?

Please write to Mike Harrison, General Manager at Safe Computing Limited, Radyne House, Molly Millers Lane, Wokingham, Berkshire, or telephone Wokingham 791212.

A member of the Chubb Group